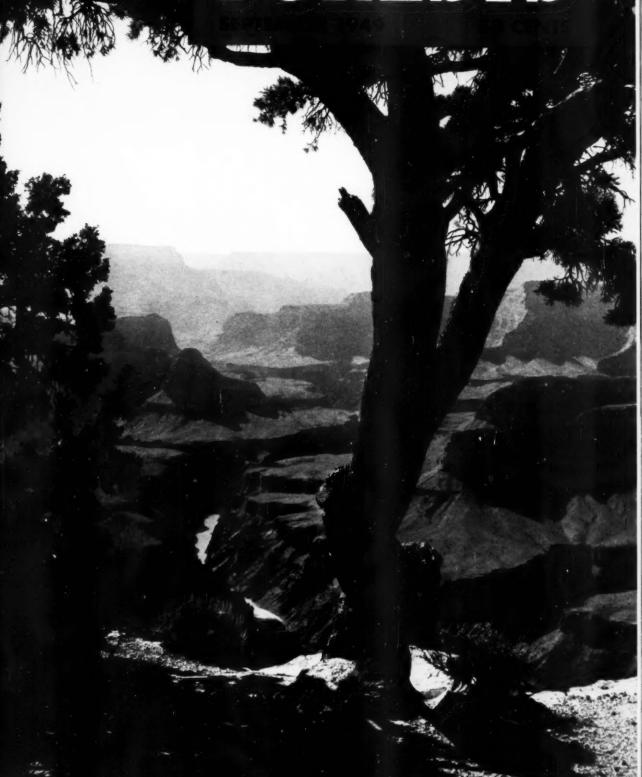
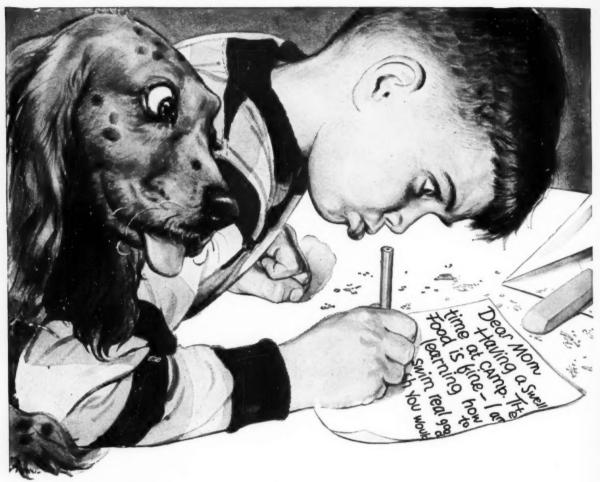
FORESTS





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The American Forestry Association is a national organization-independent and non-political in character-for the advancement of intelligent management and use of forests and related resources of soil, water, wildlife and outdoor recreation. Its purpose is to create an en-lightened public appreciation of these resources and the part they play in the social and economic life of the nation. Created in 1875, it is the oldest national forest conservation organization in America.

FORESTS

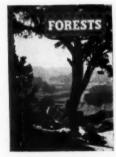
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ERLE KAUFFMAN Editor

JAMES B. CRAIC Assistant Editor

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THE COVER

This lonely pinyon pine silhouetted against the cosmic majesty of the Grand Canyon of the Colorado was one of the late John Kabel's favorite camera studies. Perched on the very brink of the chasm, the battered old pine is a year-round observer of one of the greatest spectacles on earth—the bewitchingly beau-tiful pageantry of fleeting colors and shadows. The world's greatest example of stream erosion, the canyon is a mile deep. The late John C. Van Dyke once described it as "more mysterious in its depths than the Himalayas in their height."

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LETTERS TO THE EDITOR

We Missed the Wildlife Angle

I was impressed by the fine article ("Getting on The Contour," by Nort Baser, July issue) on the soil conservation work being carried on in Harford County, Maryland.

However, there is one important phase of this work that you fail to mention—that of wildlife management. For the past three years, the U. S. Soil Conservation Service and the Maryland Game and Inland Fish Commission have been working under a cooperative agreement to aid and assist each other in farm-game refuge establishment and wildlife habitat improvement work on farm lands in that county.

Through the splendid cooperation of the Soil Conservation Service and farmers in the county, much progress has been made toward improved wildlife conditions and higher wildlife populations. An example of our cooperative work may be seen on one of the farms mentioned in the article—that of Lloyd Weaver. Here the Soil Conservation Service and the Maryland Game and Inland Fish Commission have pooled their plant-stock and technical resources to establish a seven-acre farm-game refuge. This refuge is utilizing a portion of the land that was too steep to farm and was therefore waste. Conifers and wildlife feed plantings have been made on this land, and it is now producing a "crop of game." The field men of the Game Department rolled up their sleeves and assisted Mr. Weaver in the establishment of the boundary line fence for this area. This is typical of the work being conducted by the SCS and the Maryland Commission throughout Harford and other counties in the region. I believe this fine work is worthy of note in your magazine.

George D. P. Patterson Wildlife Field Superintendent Baltimore, Maryland

For a Multitude of ludges

I was much impressed with the article "A National Land Policy," by Lloyd E. Partain, in the June issue of AMERICAN FORESTS.

I am particularly interested in, and wholly in accord with the paragraph "The conservation of soil and water by efforts of the individual landowners and operators is the most important contribution that can be made to the carrying out of this land policy. Locally and democratically organized groups of landowners and users are the best known 'vehicles' for carrying out soil and water conservation programs designed to improve and perpetuate the productivity of our basic natural wealth—the land." I am a firm believer in the old proverb "Where there are a multitude of judges, there is safety."

Yet state and federal laws need to be modified so as to reduce and/or eliminate the confiscatory feature of present taxing methods. A growing tree has no way to pay an annual tax. A tree can only pay a tax when it is harvested or when it is sold. The public must of necessity carry the tax burden of growing trees or suffer the result, ultimately—no trees.

H. J. Kruse

Cable, Wisconsin

Making the White House Safe

I've read Floyd B. Quigg's article, "Preserving White House Traditions," in your June issue, with great interest. It gave me a pretty good general idea of what has brought the building to its present dangerous condition, which I was unable to get from newspaper accounts.

But it is with regret that I find him advocating repair of the building with the

vocating repair of the building with the same type of wooden structural supports that were employed more than a century ago just "to preserve the tradition," though much safer types of construction for such a building have been developed since Hoban's time. It would seem as reasonable to employ the flintlock muskets that were the very latest thing in Washington's army.

Can it be that AMERICAN FORESTS advocates wood construction because our for-

ests produce timber?

It seems to me that now is the God-given opportunity to make the White House safe for all future occupants, not to make it safe for the life of the new timbers that would be added. And, with all of its good qualities, wood cannot be considered safe for structural members down through the centuries. It has two serious risks. It can burn and it can be destroyed by termites. And in structural members that are concealed by finish, either one of these forms of destruction can go on for a long time undetected. Witness the collapse of the roof of the Vatican library twenty years ago, with its toll of death and destruction.

The White House should be made fireproof and insectproof throughout, for all time. The work should be planned by the very best engineers and architects in a manner to provide for all future conceiv-

able alterations.

Architects soon learn that plumbers and steam fitters have no structural sense. Mr. Quigg himself tells how they weakened supports for the main staircase and the floor joists over the State Dining Room to run their pipes. The latter could not have been done if the floor construction had been of fireproof materials. Only wood construction is treated that way by plumbers.

And some of us can remember when hundreds of government employees were killed in the collapse of the Ford's Theater, then being used for offices, by similar stupidity by someone running some new pipes.

Preserve the architectural features of the White House that can be seen by the boys and girls, or reproduce them if they must be destroyed in making the building safe, by all means. But don't risk the lives of future occupants or visitors to the building, just to preserve the traditions. Surely \$5,000,000 should be sufficient to make it safe for all time, and to have the work done in the very best manner, and supervised by the finest array of architectural and engineering talent that we possess in this country.

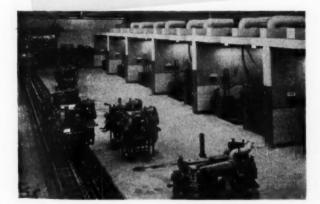
Charles M. Merwin

Washington, D. C.

Getting Tough with the Burners

As a member of the AFA, I wish to call your attention to the following item—and in connection therewith suggest that na-





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tional legislation be enacted in order to help conserve our forests.

My family and I were motoring over Route 17 in New York and New Jersey. Near the town of Ramapoo traffic was fairly heavy, some cars were unable to make the mountain grades and were overheated, stopping on the shoulder of the road. It was noticed that an occupant of a stalled car threw out a cigarette butt onto the roadway. A fast-moving car going in the opposite direction sucked this butt into its wind stream and deposited it in a dry tuft of grass and leaves. As we proceeded up the hill in traffic, at a ten-mile gait, we could see this tuft of grass smoking and about to burst into flame.

Carelessness of this type is as bad as that of the camper who does not see that his campfire is thoroughly drenched. Furthermore, the public has been warned time after time, with reference to travel courtesies, about the need for fire prevention.

It is suggested that regulations be enacted so that heavy fines, possibly \$100—half of the fine could go to a reforestation program and the other half to general county improvements—or a prison sentence of six months minimum should be imposed.

It is further suggested that drivers' licenses of all states bear the warning of fine and imprisonment to the driver of a car whose occupants throw cigarette or cigar butts from the vehicles.

Benjamin Harrison

Brooklyn, New York

Muskingum and Government Spending

Since I live in Muskingum County, I was especially interested in the article "The

Miracle of Muskingum," in your July issue, Perhaps I liked it because of its enthusiastic description of an area which, on the darker side of the picture, is being gutted by strip mines in certain localities.

Without wishing to minimize the splendid efforts of the district leaders you describe so ably in the article, I would like to ask one or two questions about the relationship of the article to the editorial by Ovid Butler ("The People Take Over in Muskingum Valley").

It seems to me that Mr. Butler is dismissing too lightly the part the federal government played in the Muskingum development. He debunks so heartily the "theory that only the federal government, by virtue of its power to tax and borrow, is in a position to initiate and develop large conservation works of local or regional scope."

Is he not underestimating the importance of your figures: "The original federal grant of \$22,090,000 for construction purposes was increased by 1936 by \$3,500,000 and in 1937 by an additional \$1,600,000?"

Granting all the fine planning, organization, and work done by the local "on-theground" leaders, wasn't this federal expenditure a necessity to bring the plans into rapid fruition? And is not this still the case with other plans being developed on a regional basis?

Isn't the emphasis—that of local and federal cooperation—a truer one than the emphasis of Mr. Butler in his opening sentences: "these days of . . . schemes to extract from the federal treasury large sums of money for local spending . . .?"

John D. Kendall

New Concord, Ohio



Since publication in the February issue, there has been lively interest in the identity of one or more or all the men in the above photograph, made in 1909, of the early forestry classes at Cornell University—the first in this country. So we asked Ralph S. Hosmer, Professor of Forestry Emeritus at Cornell, to do the identifying for us—and reading from left to right, here is his report: Front row, I. T. Worthley, Rushton H. Charleton and Frederick W. Fassett. Second row, Walter Mulford, H. J. Tompkins, Filibert Roth, Dr. B. E. Fernow, Dr. John C. Gifford, Ralph C. Bryant and Clifford R. Pettis. Third row, T. F. Borst, Wilhelm Klemme, W. W. Clark, A. S. Williams, Howard M. Longyear and Raphael Zon.

WASHINGTON LOOKOUT

By A. G. HALL

Senate passage of the Granger Bill (H.R. 2296) on the Consent Calendar on August 9, sends this measure to amend the Clarke-McNary cooperative forestry law back to the House of Representatives. As explained in the August issue, the Senate Committee on Agriculture and Forestry eliminated from the bill provisions for expanding farm forestry activities. As passed by the House, the bill included authority for federal expenditures of a maximum of \$6,000.000 annually by 1953 for the employment of foresters to aid small woodland owners.

It is generally believed the House will agree to the Senate eliminations and accept what is left of the measure—increased funds for fire control and reforestation activities.

An access roads program was also approved by the Senate on August 9. This bill (S.J. Resolution 24, introduced by Senator Morse of Oregon) proposes \$30,000,000 for the building of timber access roads in federal forests. Because the bill lacks clear-cut distinctions between timber access and other types of roads, it is meeting with some opposition from forest industries which do not want general purpose roads constructed at relatively high costs under this authority. A bill designed to assure that funds for timber access roads be used only for that purpose has been introduced by Senator Cain of Washington. His bill, S.J. Resolution 121, authorizes a total of \$75,000,000, not more than \$15,000,000 to be spent in any one year. It further provides that no road shall be built until a public hearing has shown the road to be practicable and feasible, that there is reasonable prospect receipts from the sale of existing merchantable timber tributary to the road will at least equal its cost.

The Cain bill obviously would restrict the U. S. Forest Service in its use of access road funds. It is unlikely, for example, that any access road would be built unless the wood industries in the area concerned wanted the road built. On the other hand, a broader authorization, such as that included in the Morse bill, would permit the Service to operate

independent of the wood industries, if it so desired, and utilize timber access funds for general purpose roads. Obviously, too, there is some fear that by skillful use of the funds, the Service could exercise a degree of control over the forestry economy.

It is a fairly safe prediction that neither measure will become law. What appears to be needed is a meeting of minds among federal, state and private interests. The wood-using industries need access roads in many areas in order to utilize their own as well as federal timber in a sustained economy. The Forest Service needs access roads if it is to redeem its responsibilities as custodian and manager of the national forests. Under its multiple - use concept, the concept which appeals to the public at large, however, it must take into consideration the possible use of such roads by recreationists and others.

Federal aid to state fish restoration and management projects was approved by the House on August 1. The bill, H.R. 1746, introduced by Representative Dingell of Michigan. would limit such aid to those states which provide by law for fish management and restoration projects, including the use of license fee income solely for fish and game administration purposes. Federal aid would be based on federal tax receipts on fishing equipment and be distributed to states according to area and licensed fishing population.

While this is a desirable measure from the standpoint of the sportsman, it appears to be another case of the federal government doing a job which should be done by the states. Note that the law would apply to states already having programs and would be financed by taxes paid by fishermen and distributed by the federal government in proportion to the licensed fishing population. The question which the taxpayer must ask himself is: wouldn't it be cheaper to collect and spend the tax money within the state, without it first going to Washington to be returned at a discount rate? The same question might well be asked of many conservation activities.



The Challenge of Land Ownership

Have we the moral right to "do as we please" with the land we own or occupy? No, says this distinguished farmer-conservationist, with the warning that unless we abandon this destructive concept and become instead trustees of the land, freedom of decision in the planning and management of our lands may be lost forever

By KENT LEAVITT

REES may mean no more to the farmer than to the city dweller, but as custodian of a considerable portion of the country's supply, the farmer has a responsibility far greater than his urban neighbor.

Both benefit from trees in hundreds of ways: wood in its various forms for a multitude of needs; a plentiful supply of water for both domestic and industrial use; paper products of all descriptions; beauty and shade for homes and streets, schools and playgrounds. The list is long and becoming longer as the chemist, the paper manufacturer and the industrialist delve into the seemingly limitless possibilities of wood as a source of raw material. Only a month ago I saw grass silage being mixed with molasses made from sawdust.

Thus, how can the farmer, no less than the city dweller, do anything else but take a vital interest in where trees grow, how they are protected and the future supply upon which his children will be even more dependent? To develop, improve and protect our forests, one of our greatest and most valuable renewable resources, is a gigantic job. It is a job so big and so diverse that there is a place or a task for everyone who wants to see this country retain its position of strength in the world—and its place at the top of the standard of living scale.

Before taking action we must understand two basic things, (1) what has happened to our forest lands and, (2) what part we as individuals can take under our form of government to improve the situation.

To our ancestors and even to some of us today, trees and forests were at first a nuisance to be removed and, later, a source of income to be taken advantage of. Furthermore, the extent of the original forests was so vast that until recently no one thought they could possibly be exhausted. The result of this impact on our wood reserves has been tragic. How tragic may not be known for years. Only when water supplies diminish or greater floods develop or more rivers and dams silt up will we recognize the price we are paying for ignorance.

In Maine I have flown over vast areas of second growth soft birch and other trees of little value, growing on land where once stood great forests of pine that, with proper management, might now be ready once again for the lumberman's ax. It was the same when I stood on a hilltop in the Poconos of Pennsylvania. A

THE AUTHOR

President of The National Association of Soil Conservation Districts, a Director of The American Forestry Association and owner and operator of 400-acre Fraleigh Hill Farm in the uplands of Dutchess County, New York, Kent Leavitt is eminently qualified to deal boldly and realistically, as he has done, with the responsibility of land ownership.

One of the nation's most distinguished conservationists, and a farmer since 1935, he has also been a banker and for five years was a member of the Consular Service.

His letterhead carries these words: "With the right to own goes the duty to conserve."





Soil Conservation Service

When we accept the responsibility of trusteeship, says the author, we accept the challenge to improve our land for the next owner or beneficiary while taking a fair profit from it for ourselves

great white pine forest once spread over the acres now covered with blueberries and scrub oak, the result of mismanagement and constant burning. The same story is told again and again in the South and West. Profligate use with little thought for the future.

So now with a growing population, a constantly improving standard of living and an ever increasing demand for forest products, we as a nation must take action. It must follow lines similar to those which we, as farmers, are attempting with our soil conservation districts (see "Getting on the Contour," by Nort Baser, in American Forests for July). In fact, the work must be carried on simultaneously, for in a vast number

of cases, the landowner controls both farm and forest.

Our first step must be to change our thinking about the ownership of land. To date, state laws have allowed us to own land in fee simple, to do with as we choose. Here and there we may find proper land-use regulations or restrictions, local ordinances or state laws which may limit the use to which land may be put, thus preventing injury to neighbor or community.

Such regulations are few and far between. Some are called zoning laws, but most of them point the way towards the general conception of proper land use, i.e., the best use to which the land must be put for the greatest benefit to the largest number. If we are to develop such a program under our system of private initiative, it is obvious that we must change our basic thinking about the



duties that go with the privilege of ownership.

If all of us who are owners and operators of land in America can consider ourselves trustees of the land. we will have taken the first great step. By law, in most states, trustees have two great obligations. They must see to it that the life tenant of the trust receives therefrom a fair income. In most people's eyes a fair income lies somewhere between the absolute security of a low coupon, tax-exempt bond and the high profit due the speculator. The average landowner and operator, assuming his trusteeship, will in all probability, have to limit himself in a similar fashion.

The second duty of a trustee is to pass the principal of the trust on to the next beneficiary or owner in as good condition, if not better, than when he received it. Had the owners and operators of woodlands in the United States been able to conform to these simple rules, there is no question but that our potential wood supply would be infinitely greater than it is today. I should like to say at this point that the obligation is certainly not entirely upon the shoulders of the

Tree farmers know what it means to plan today for a profitable tomorrow



landowner and operator, and I hope before finishing this article, to prove that this is not just the problem of the landowner and operator, but one which involves practically every element of our society.

Those of us vitally interested in soil conservation district work believe that a great new science—the science of proper land use-must be developed if our program is to be successful. This holds true also of the forest industry. Men like Egon Glesinger. author of The Coming Age of Wood, point clearly to the many new ramified uses to which forest products can and will be put. Furthermore, as he so concretely shows, many of the new uses, as well as the more scientific treatment of forest areas, will not be possible until this new science has been developed further and new and more integrated wood industries are established.

The very fact that only a few processors of forest products look at a tree as 100-percent raw material, tends to prove the relationship of this new science to the proper use of our forest land. So many of our industrialists, using wood as a raw material, think only of that particular type of wood. shape of trunk, or some other specific dimension, rather than of the whole tree as a source of vitally needed cellulose. It is generally recognized that the wastage of wood runs up to the staggering figure of fifty percent. That is why I claim that not until our wood-using industries can become completely integrated will the science of properly using our forest products be sufficiently developed to enable us to feel that a real conservation program is in effect.

Fortunately for us, a few of our great lumber companies have seen the intimate connection between properly managed forests, an integrated forest products industry and the profitable development of a great business under our economic standards and our democratic form of government. I had the pleasure of taking a trip through the Weyerhaeuser plant at Longview, Washington. From the time I entered the gates until we were exhausted by the many ramifications of this great manufacturing center, it was evident that more and more of those portions of the tree which used to be considered waste are now becoming commercially salable products. But I am sure that even the Weverhaeusers themselves do not believe that research is at an end and



U. S. Forest Service

that the proper use of wood has reached its ultimate development.

I only mention this one company because it happens to be the only one which I have been privileged to see in action. But I am sure that as we develop our sense of trusteeship, and as we expand the new science above mentioned, more and more integrated forest products industries will be developed to avoid waste and make more efficient and profitable the proper use of forest areas.

So much for the development of the sense of responsibility of trusteeship and of the new science of proper and profitable land and forest use. But there is one thing more that must be done—prove to the landowner and operator that proper use of his property, be it in farm or forest, will be beneficial not only to him but to the generations to come. Once proven, the adoption of the science of proper land use will spread rapidly across the face of our country.

In order to prove it, we may have to change not only our methods, but



Men like Alex Forster of Cooperstown, New York (pointing), understand the privilege of ownership. So that it may become productive again, he is acquiring abandoned farm land and planting it to trees

even our laws. Our government, both state and federal, will have to assist, not only in research work, but also in the actual practice of applying the science to the land. Our educational institutions will have to carry on an active program. Our legislative bodies may well have to readjust the basis of taxation in order to make the proper use of our forest lands profitable. The bankers and industrialists, who not only control land through credit and other types of business liens, but also have an active interest in the produce of these lands, must take their full share of responsibility in developing our program.

Only if we, as citizens, take an active part in the conservation program, and I use conservation in the broadest sense of the word, will we be able to avoid the regimentation and regulation which has so embittered and embroiled the peoples of Europe. We in America have been lucky so far that the plethora of our raw materials has enabled a high standard of living

and, to date, has been able to meet the increasing demands of our growing population without necessitating vast amounts of mandatory legislation.

But the time is rapidly approaching when, if we as citizens do not shoulder our responsibility of ownership, we will be forced, through the pressure of our increasing population, to submit to complete regulation.

I have for several years been deeply involved in the development and operation of soil conservation districts throughout the United States. More and more we are beginning to realize the intimate relationship between the proper use of the land and the health and wealth of our community. The district movement, which started in a rather simple fashion to assist farmers in establishing soil and water control programs on their farms, has now developed into an organization attempting to correlate the many and varied programs that have to do with the proper use of

land. Furthermore, to develop them into a plan that is satisfactory at the county level, and available to any land operator sufficiently well educated to see the advantages of such a coordinated approach.

Education, extension work, agricultural forest research, water conservation and control measures, reforestation and proper crop rotation, all these and many more begin to take vital places in this program. All are based on proper land use. All are practical and most of them profitable. I am convinced that as this integrated program continues to develop, we in America will continue to have all the things which we need for our standard of living.

But the program can never reach a point sufficiently advanced to achieve this result if every citizen of our country does not make some effort to shoulder his responsibility in protecting and improving his renewable resources.

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Photos by E. P. Haddon The Longhorn has found a new home on the Wichita Mountains Wildlife Refuge in Oklahoma



HE Longhorn, a steer that can outrun an antelope and is as ornery as a roundup cook during a norther, is noted for many things—except efficient beef production.

"There have probably been nobler creations than the Longhorn," B. W. Allred once wrote in *The Cattleman*, "but those other creations didn't get born at the right time like the Longhorn did. The Longhorn had the foresight to advent along with the ruggedest pioneering period of the West. That's why he can't die. He goes right on living in the music and literature of the nation."

Actually, the Longhorn, as he was known to hard-riding cowboys of Chisholm Trail days, had been nearly canceled out by intensive cross breeding as early as 1900. Ten million Longhorns were drained off the

Texas ranges from 1886 to 1890. The introduction of new blood evolved a more placid variety of animal that produced more beef. But he's a pretty tame specimen compared to the slabsided, cranky Longhorn, and it is doubtful if many legends will ever be woven around his eccentricities.

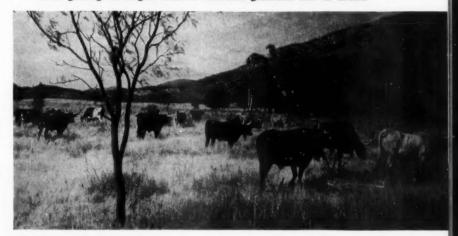
The Longhorn and the buffalo started coming to the end of the trail about the same time. Both were predestined for extinction by different methods—one by the breeder's art, the other by hunting. Recognizing that the buffalo is as American as the nickel he appears on, early efforts were made to conserve a few remaining herds.

But the Longhorn is just as American as the buffalo and, in 1927, when only a few stray specimens could still be found on western ranges, a few farsighted, philanthropic men decided that something should be done about it. That was how twenty Longhorn cows, three bulls, three steers and four calves were delivered to the Wichita Mountains Wildlife Refuge north of Cache, Oklahoma. Today the herd numbers 286, of which seventy-two are calves.

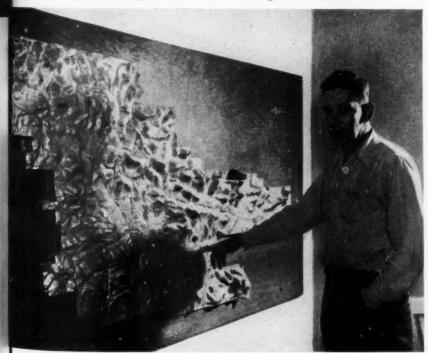
The herd was put in charge of William Earl Drummond, a fifty-sevenyear-old ranger on the Wichita Refuge and the man who fathered the idea in the first place. As Refuge Manager Ernest J. Greenwalt com-



Above, Wichita refuge range as seen from Mount Scott. Below, Long-horns grazing on largest area of bluestem grassland left in nation



Using this relief map of refuge, Manager Ernest J. Greenwalt points out approximate locations of Longhorn and buffalo herds



ments, "Drummond has been a completely happy man since he took over this herd. His kinship with the Longhorns goes back to the days of his boyhood on a Missouri farm."

Charles Goodnight, the famed Texas cowman, was one of Drummond's good friends. When he visited the Wichita the pair squatted on their heels and swapped Longhorn yarns, including stories about Old Blue, the "point steer" owned by Goodnight. Year after year this celebrated animal led herds from Texas to Garden City and Dodge City, and after delivering them at the railhead would head back for Texas, arriving at the Goodnight corrals in several weeks. Drummond is fond of telling of his long friendship with Hunting Horse, the 101-year-old Kiowa who was General Custer's Indian scout.

The Wichita herd features a wide range of colors and color patterns with solid reds, blacks, white and yellows, spots, speckles, polka dots, stripes, brindles, linebacks and "agrullas" (mouse-colored). There

(Turn to page 40)

Growing Quality Hardwoods

By RUSSELL STADELMAN

Nickey Brothers of Memphis, is making a unique investment in forest management—direct aid to landowners who are willing to grow more profitable trees

The hardwood forests of the South definitely are not the economic liability many have claimed for them. When the right management practices are applied quality trees can be grown — faster than most people think. And quality hardwoods are an asset on any economic scale.

This statement takes into account the fact that the southern hardwood forest is a vast mixture of good and inferior species of trees. This, along with great differences in the quality of the same species due to form of the tree, length of trunk, shading of side branches, fire and insect damage and other factors, makes the forester's problems more complex than those involved in the southern pine forest

Then there is the matter of small holdings, perhaps the primary problem of management. For example, of thirteen million acres of forest land in Tennessee, at least half is in tracts of eighty acres or less. And while the majority of larger holdings is receiving some form of management — in fact, larger tracts held by most forest industries have the services of technical foresters—these small properties, continually subjected to highgrading, pretty generally have been left with inferior species and lowgrade trees.

Nevertheless, the benefits of proper management in raising quality hardwoods and in increasing growth are an incentive to spur the efforts of any woodland manager. For example, a single large high-grade white oak might be worth as much as \$50, whereas a low-grade tree of the same size and volume might be worth no more than \$5. Furthermore, the grower of good quality hardwoods need not worry about markets. Demand for low-grade hardwoods ilimited—very limited. But it is always possible to sell the higher grades.

The average hardwood stand in Tennessee is growing less than 100 board feet an acre annually. Contrary to popular but false conceptions of the slow growth of hardwoods, these stands are capable of growing 300 board feet an acre. In fact, it has been shown in the better bottomland hardwoods that 400 board feet annually is possible — and is being grown. It is not uncommon to find red oaks growing five inches in diameter in ten years. Exceptional trees

will add an inch in diameter a year.

Adequate fire protection alone would double the present growth. Many hardwood stands would have from twenty-five to forty percent greater sound volume at the present time if defects due entirely to fire damage were not present. It seems true that the inferior species suffer most from fire and, as a result, the already perplexing problem of util-

Quality forest in the making—white and red oak tree farm after selective cutting. The trees left are straight, long-bodied and growing rapidly

Tennessee Conservation Department



izing these species is intensified.

There is, of course, much foresters do not know about hardwood management. One reason is that most of the forest management practice taught in our forestry schools is based on softwood forestry and is not applicable to hardwood. For example, diameter limit cutting should have little place in the hardwood plan; instead, quality and growth of the tree are prime considerations as to whether it should be cut or left for further growth. But we know enough to go seriously into the business of growing quality hardwoodsand we are learning through experiment and research every day.

Thus with experience enough to get started, the problem of the small timber property is being attacked vigorously in certain hardwood areas of the South. This is particularly true in the nation's hardwood center at Memphis, where Nickey Brothers, Incorporated, producers of hardwood products since 1866, has developed and put into effect a plan to encour-

age tree farming on small hardwood tracts. In essence, it is an operation based on an investment in forest management rather than in land ownership, the company working with farmers and other owners of hardwood tracts of from forty to a thousand acres.

Under the plan, the company's technical foresters mark all trees to be cut. Prices, in most cases, are based on graded logs, scaled after cutting. Thus, receiving more for his good logs and less for logs of lower quality has impressed the hardwood tree farmer with the importance of growing quality timber.

The initial cutting is considered by company foresters as an improvement operation designed to remove inferior species and lower grade trees. This insures that future growth will be on the basis of quality and preferred species. It sacrifices present needs by leaving the better trees to build up the worth of the future stand. This reverses past practices in these small hardwood tracts which were usually

high-graded for the better trees and left with the low grade and low value species.

Company foresters also attempt to convince the hardwood grower of the need of excluding grazing and fire if quality young growth hardwoods are to be established. In many instances where desirable young trees are lacking because of past severe grazing, hardwood seedlings are provided to the tree farmer without cost—and the company assists in their planting.

A typical working agreement between Nickey Brothers and a small-scale hardwood grower is the 200-acre tree farm of E. K. Boyd at Bolivar, Tennessee. An improvement cutting, designed to take out only the lower grade and less desirable species, was made on this upland hardwood tract in 1946, removing 250,000 board feet. This cut consisted of 40,000 feet of better grade logs, mostly white oak, with some red oak and tulip poplar (tuliptree). The remainder, around 200,000 board feet, were

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Undesirable trees, taking up valuable growing space, are girdled or poisoned during logging operations

To prevent loss through decadence, trees should be cut when they are no longer growing at good rate





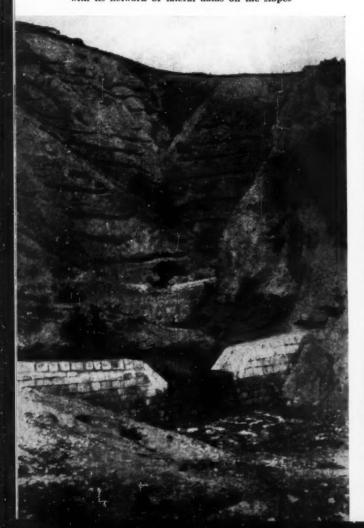
The pine forests on the lower mountain slopes of Greece are chiefly valuable for naval stores



Nurseries, with seedbeds sunken to trap water, have capacity of 45,000,000 young trees a year

An American forester finds that goats and guerrillas are two great problems standing in the way of forestry progress in Greece. Once these are solved, the big job is to replant seven million acres — one out of every five in this ancient land

Key to torrent control is the stone channel dam with its network of lateral dams on the slopes



Closeup of lateral dams, made of woven willow. Soil gradually fills in behind these structures



A Forester Visits Greece



AS A FORESTRY specialist with AMAG — American Mission for Aid to Greece — I have had opportunity to look pretty closely at the Greek forest situation. It isn't good. In fact, it is decidedly bad. The original Grecian forest has practically been destroyed by clear cutting, grazing and fire. And the accessible part of the remaining forest is seriously overcut.

In a word, of Greece's land area of around thirty-one million acres, only slightly less than five million are now classified as natural forest land. There are seven million acres, however, of potential forest land—mountainous land for the most part suitable only for tree growth and grazing. Thus, the most challenging long-term forestry problem facing the Greeks is the reforestation of these seven million acres, a job which will require several hundred years to accomplish—if it is ever accomplished.

Greece has been ravished by many wars and each has left its mark on her forests. The heavy drain of World War II was particularly harmful because of dwindling timber supplies—and postwar guerrilla activities have not helped the situation. In fact, a major portion of the remaining commercial forests of Greece is located in the high country occupied by guerrillas. The effect of this on forestry operations in these commercial stands is obvious.

These high forests are composed largely of fir, pine and beech. At lower elevations are fairly extensive oak forests, but in general the stands are open and scattered. Chestnut is also found, though restricted in range.

By J. A. FITZWATER

The species is a good timber tree and its fruit, similar to the American chestnut, is a food item prized very highly. On the lower mountains pine (pinus halepensis) is the most important and most prevalent species. It has a short trunk and a tendency to be crooked—but it is quite valuable for naval stores. It is the resin from this pine the Greeks use in their national drink, retsina wine- the wine that "shellacs" your throat. There are also quite a number of native hardwoods in the low country-elm, oak, maple, cottonwood, plane treebut they are seldom found in commercial quantities.

It should be obvious from all this

that wood is at a premium in Greece. During my stay in that strife-torn country, I encountered no sizable wood-working establishment. There are quite a number of small industries making such things as pack saddles for burros, furniture, oxen vokes, carts, wheels and bird cages. Oak, beech and elm are the principal species used. Cottonwood (populous canadensis) was observed being used for mine props and, in one instance, was manufactured at a small plant into dimension timbers. Incidentally, this species makes very rapid growth and appears to air dry with very little warping. Planted stands of cottonwood are found along the dykes of the Axios and Gallicos rivers in Macedonia, which attain a diameter of ten to twelve inches and a height



Greek forest officials, with Director Christodoulopoules second from left



Labor for forestry work is cheap in Greece. These women nursery workers are paid ninety cents a day — men \$1.40

of forty feet in eight to ten years. The species appears to have excellent possibilities for planting on the wasteland between the dykes and the rivers.

Practically all houses and other buildings are constructed of stone and stucco. No wooden houses were observed. Wood for doors, window frames and casings is at present entirely imported, mostly from the Scandinavian countries. Roofs are of red tile.

Fuel of any type is hard to get, and with the peasants it usually consists of what can be termed "brush"-the branches and foliage of a scrub oak which grows on most of the mountainsides. Seldom are these branches over a half inch in diameter. Those living near the forest, or what once had been a forest, go back into the mountains and collect dead wood, chunks, or cull material and dig up whatever stumps have been left. Opportunity for this kind of salvage is limited, however. Furthermore, this material has a high sales value in the towns and the need for cash often outweighs the desire for good fuel when something else can be substituted.

With most of the high commercial forests controlled by guerrillas, there was little logging or sawmilling at the time of my visit. For the same reason it was impossible to observe some of the timber management areas Greek foresters had in operation before the war. That many of their managed forests were badly cut by the enemy is known, but there has been little opportunity to appraise the extent of this damage.

I did, however, observe their tree planting work — part of the tremendous reforestation job the Greeks have ahead of them. Of particular interest were their tree nurseries, varying from three to fifty acres, and aggregating around 150 acres, which should produce from forty to forty-five million seedlings a year.

Many of the nurseries, particularly in southern Greece, are perched at the head of small drainages or on flat hogback ridges running out from the mountains. The flat country nurseries in northern Greece are well located and, with improved techniques, can produce a large number of trees. Nursery seedbeds and transplant beds are all sunken and, in the mountains, the sides of the beds are eight to ten inches high. The purpose of this wall is, of course, to retain all available water—and water is scarce in southern Greece.

Top soil for the beds is brought in from garbage and trash dumps adjacent to the larger cities. Often this soil has been in the making for twenty years and is in general of good texture.

No commercial fertilizers are used. In some nurseries compost pits are maintained with cow manure as a base; in others dry sheep manure is applied direct. The nursery bed walls in a flat country are not so pronounced but even here they are maintained to a height of six to eight inches. There seems some justification for the sunken beds in the mountainous country, but certainly not to the degree used. And in the flat country it would seem the walls could be entirely dispensed with.

The principal objection to the permanent walls is that the technique precludes the growing of cover and green manure crops, prevents the rotation of seedbed location, and in wet seasons there is a tendency for the seedlings to drown out. The walls also complicate the operation of preparing the seedbeds.

Labor is, of course, cheap in Greece and that has been a big factor in the procedures and techniques followed. Women work in the nurseries for ninety cents a day, men from \$1.10 to \$1.40. Most of the mountain nurseries are in southern Greece and precipitation, which is from sixteen to eighteen inches, has been a major factor in the type of seedbed used. In Macedonia, precipitation is about twenty-eight inches and in Epirous, the wettest section of Greece, thirty-eight inches.

Both one and two-year (one year in transplant bed) stock is grown in the nurseries. Sowing is done both spring and fall with lifting and planting in the fall—October and November. Seed sown in April does not, as a rule, produce a very high percentage of plantable stock by October. Much of it must be transplanted and carried over until the following fall. It was strongly recommended by American observers that the practice of fall sowing be adopted since it produces a good, strong stock and greatly reduces the need of transplanting.

The principal coniferous species grown is pinus brutia, a pine of rapid growth and good form. It is not a native of the mainland but is found 200 miles away on islands of the Aegean. It occurs on soils similar to those on the mainland at about the same elevation, and with comparable climate. Plantations up to twenty-five years old show much promise.

Some Austrian pine is grown in the mountain nurseries. Two species of cypress are grown to a limited extent and planted in mixture with pine. These do not give the impression of having value as a timber tree since they have a tendency to develop a number of stems. However, they seem to be in high favor with the Greek foresters.

The principal broadleaf species planted are eucalyptus, cottonwood, willow, black locust, elm and plane tree. The first three are propagated from cuttings, the others from seed. Our native black locust is very popular in Greece and is planted extensively as a shade tree and for stream control; it makes rapid growth and

seems to grow well on much poorer sites than it does in this country.

Watering in the mountain nurseries is done mostly by hand from large cans supplied by hose, while direct irrigation by ditch is largely used in the flat country. No overhead sprinkling systems have been installed.

A crew of two set the trees out in permanent sites—a man digs the hole, a woman follows and plants the tree. The holes are dug deep and only partially filled in when the tree is planted, the object being to leave a pit to catch rainwater. In southern Greece the plants are watered the first season, which just about doubles the cost of planting. With watering, survival is about eighty percent; without it results are very unsatisfactory, many times approaching complete failure.

In view of the tremendous reforestation job to be done and with most of the area in reasonably accessible territory, it appears logical to place present planting emphasis on those sections where watering is not essential. Survival in Epirous and Macedonia runs from sixty to eighty percent.

The most extensive planting has been done for torrent control. The torrents, or mountain streams, are primarily wet-weather streams and, except for the larger rivers, seldom carry water during the summer. During the winter rainy season, however, they run wild, transporting tremendous quantities of boulders and gravel out of the mountains. The beds of the torrents become choked by the time they reach the flat country and the debris is spewed out over the agricultural lands, causing great damage.

Control measures consist of building permanent dams in the main stream channels, thereby reducing the stream gradient and preventing the stream beds from cutting deeper. Also, in many instances when the debris stabilizes behind these dams, vegetation becomes established. In one instance observed, a heavy mat of sedge had seeded in on an acre of deposited material behind such a dam and had every appearance of being permanent. Willows and shrubs also become established behind the dams on the smaller torrents.

These permanent dams are supplemented by lateral structures along the slopes, which are really small wicker dams. They are constructed by driving three-inch oak stakes, three feet long, into the ground about two feet, spacing the stakes about a

foot apart. Willow brush is then woven in and out of the stakes. Soil fills in behind these structures, forming little benches. These are planted to trees the year following construction.

Greek foresters give these wicker dams a life of from eight to ten years. Dams of this type are also built across small gullies and, where water is present, green willow is used in the weaving. This sprouts readily and establishes a permanent barrier. Work of this nature is costly and would probably be prohibitive were it not for the exceedingly cheap labor. However, it seems to be very effective, providing it is not attempted on slopes too closely approaching the perpendicular.

Considerable planting of this kind will make but slight contribution to the timber economy of Greece, since it will be unsafe to remove this cover once it is established. However, much torrent control planting is necessary to hold the runoff on the broad flat hogback ridges and moderate slopes leading into the torrents, which will produce merchantable stands that can be safely operated.

Greek foresters in their tree planting program are faced with a very great problem — what to do about grazing animals, particularly goats. There is a tremendous goat population and this animal, or a satisfactory substitute, is absolutely essential to the existence of the Greek peasant; goats furnish him with milk, meat and hides.

The goat is a particularly valuable animal for Greece since it can rustle a living on the poorest of forage and withstand almost any hardship. They (Turn to page 38)

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Fuel is scarce in this ancient country. Here carefully gathered scrub oak branches are being packed by burros



Greek hospitality is demonstrated by villages of Dadi, whose luncheon for visiting foresters was festive affair

How two Quaker brothers left a heritage of beauty that is still being enjoyed is told in this story of the arboretum they founded almost 150 years ago



Minshall Painter, co-founder of the arboretum

Old Arboretum Lives Again

N THE heart of rolling Delaware County, Pennsylvania, lies a retreat of about a square mile now called the John J. Tyler Arboretum. Established in the early 1800's by two Quaker brothers, Jacob and Minshall Painter, at a time when approximately twelve million other Americans were intent upon wiping out our country's virgin timber, the sixtyeight acres of the arboretum proper and its 350 acres of surrounding

By JANE CARTER

woodland have held fast against the ax's knell. Today tumbling streams and pleasant glades welcome all who enter the gates, open daily without admission charge.

Close to my native home, I have visited Painter's Arboretum, as it is still locally known, in all seasons. Each has its unique appeal. When the

deep green of summer and the brilliance of autumn give way to winter, one can perhaps best appreciate the outlines of the splendid evergreensthe towering column of the hundredyear-old giant sequoia, reputed the sole mature specimen east of the Rockies; a sturdy native yew; or the magnificent Cedar of Lebanon, lifting thick dark boughs against the sky; and an equally fine Oriental spruce with crown ninety feet above the ground. Even in winter much bird life still remains, attracted by the year-round feeding station that the arboretum's caretaker, English-born Charles G. Whittaker, maintains. From the ivy on the old stone building one hears the cooing of doves and watches their flight across the dull clouds.

But by early May the gray trunks and bare earth are once again performing their miracle of burgeoning green. A tall willow oak drips slen-



The sunshine-drenched greenhouse
—where young plants get their start

der verdant fingers. The pale twisted trunk of the osage-orange, or Indian bow tree, the elm-leaf rubber tree and the solid eagles-claw maple, a European grafted tree, come into leaf along with scores of others. A flowering crab that dates from 1825 casts its pink glow into the air and a patriarchal Oregon grape throws out new growth; while more than a dozen different varieties of magnolia open their petals. Flowering horse chestnut makes a bank of bloom and the terminally pistillated pachysandra blossoms under the trees.

Of the original collection of about 1400 different varieties of trees, plants and shrubs established by the Painter brothers on a five-acre tract in Rocky Run Valley, only 192 remain. It is the earnest hope of Charles Whittaker, who took over restoration of the long-neglected arboretum in 1946, to eventually duplicate all the original planting. Under the direction of Carl W. Fenniger, president of the

\$500,000 Tyler endowment, and John C. Wistar, well known landscape artist and director of the Arthur Hoyt Scott Foundation at Swarthmore, much work has already been done.

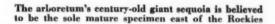
In the arboretum proper, now cleared of dead wood, honeysuckle and other trash growth, the surviving large trees and exotic plants display their full beauty. Acre after acre of surrounding woodland, made accessible by over ten miles of bulldozerhewn trails, is coming under scientific cutting and timber management. Other acreage of abandoned farm land will eventually be planted with tree seedlings. And for direction in their rehabilitating plans, Mr. Whittaker and the directors study the records kept by Jacob and Minshall Painter from 1825 until their deaths in the 1870's.

With Mr. Whittaker I entered a two-story stone building which once served as the Painter brothers' study and which is now a museum to their achievements. A small room on the first floor houses a widely ranging library. The pastel-tinted celestial globe, large telescope and barometer were part of equipment used for their regular reports to the Smithsonian Institute on wind and cloud movements. From a piece of tulip poplar one had carved a small gyroscope model. The cases of their collection of Delaware County minerals are still being catalogued.

But it is the arboretum records that interest us most, and Mr. Whittaker leads the way with his cigarette lighter through double sheet-iron doors into a dark vault. These vaults, for an identical one exists on the second floor, were designed by the Painters for the safe-keeping of their papers. Three air openings into what appear to be double stone walls maintain a year-round temperature of from forty to fifty degrees Fahrenheit.

Out into the daylight of the study

A wealth of evergreens, including this Cedar of Lebanon, contribute to the charm of the arboretum in all seasons





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again we examine a stack of material taken at random from the vault. Bound yellow sheets covered with pale clear script record the brothers' grafting experiments. Often years of work had been necessary to acclimate exotic plants; sometimes the experiments failed and had to be abandoned. Methodically they had listed the 400 different varieties of fruit trees once growing on the estate, with their sources.

The spelling of "plumbs" is strange to us, but some of the apples sound familiar: Smoke House, Roxbury Russet, Jonathan, Baldwin. Others suggest an earlier era-Victuals and Drink, Old Man's Snake, Cathead, Lady Sweeting, Jersey Greening (perhaps an ancestor to the Harvest Apple), Kitchen Apple and English Coddling. And then possibly in honor of the friend supplying the graft, for they were contemporary families in the county, Dilworth's Apple and Pennock's Apple.

Most of the pears had romantically evocative French names: Monsieur le Curé, Soldat Labourer, Triomphe de Jodoigne, Urbaniste, Striped Madeleine. With the apricots, peaches, cherries and other fruits they had long since died out. Only a large wicker-covered decanter standing on a nearby table and half-filled with vinegar preserves the aroma of this wonderful lost orchard.

Robert Carr, nurseryman and then proprietor of Bartram's Gardens in Philadelphia, had supplied the Painters with many plants, as had the Kew Gardens in London. They had noted the purchase of three small Cedars of Lebanon at twenty-five cents apiece, from the Cherry Hill Nurseries at West Chester, Pennsylvania, doing business today as Hoopes Brothers & Thomas Company.

Minshall Painter, it is said, had kept a dual diary for himself and his brother, recording in it the catholic range of their activities and the progress of the arboretum. Old county histories also give him credit for the naming of the nearby town of Media. Traveling little, the brothers were content to supervise their sawmills on Dismal Run, innovate irrigation of their fields and correspond with fellow scientists and botanists all over the world.

The second-story study gives further evidence of their roving intellects an enormous tripod and blackhooded camera, from the glass negatives of which reproductions are still being made, and a hand press on which they printed self-written tracts. But the use of the large press in the preservation of native plant specimens seems to us the richest legacy.

Bound in seven large folders, the outsides covered with wallpaper, are the leaves and blossoms, and in small plants sometimes the full stems and roots, of scores of varieties of flowers and trees. Securely stored in the dry, even temperature of the upper vault, they retain much of their pristine coloring. We catch a slight nostalgic fragrance of sunshine and meadow and notice that some of the specimens still show microscopically fine hairs. Fastened to the sheets with bits of paper and sealing wax, the collection ranges from the prickly. leaved clusters of native chestnut to the delicacy of anemone.

Outside again, we stop by the shuttered windows of the old family mansion. Built in 1739, on the original Penn grant to the Minshall family, the Painter brothers' eighth-generation ancestors, it commands a sweeping view of the arboretum. A mass of boxwood to one side was obtained from Bartram's Gardens in 1779, while the thick-trunked male ginkgo tree in front of the house is 103 years old. From the veranda can be seen the deep purple petals of a magnolia (Liliflora negra), which is a sucker growth from the original tree. From the same roots Mr. Whittaker has propagated five more trees, each having developed its own root system within two years.

He pointed out the lightning protection in the great evergreens and the tall English copper beech. A fire hose lies on Rocky Run bank, ready to fill a 250-gallon tank which can be jeeptransported anywhere on the estate. With its vapor-fine spray, Mr. Whittaker has quickly extinguished a fiveacre fire. Useful as fire engine,
(Turn to page 45)



Delaware county girl scouts work at the arboretum on Saturdays. They clear out dead wood and trash, plant willow and searlet oak seedlings. Sixty-five girls volunteered this summer

Reading Tree History in Pollen Dust

Pollen analysis, a young science, reveals the secrets of Nature through the silent centuries

By J. E. POTZGER



Taking pollen sample from Hiller-type peat borer

Pollen analysis is a young science which had its beginning in 1916 when the Swedish geologist, Lennart von Post, presented a paper before Scandinavian naturalists on pollen of forest trees in the bogs of southern Sweden. This led to the idea that fossil pollen might be a good indicator of climatic and forest changes since retreat of continental ice caps. Pollen analysis has served successfully to this end and, in addition, has given valuable aid in many other problems.

Pollen analysis is based on the following facts:

The open bodies of small and large

lakes left in the wake of continental ice masses became excellent collectors of pollens of plants which moved into the region. The pollens and the plant fragments formed the muds on the bottoms of the lakes, and they slowly accumulated until the lake basins were transformed into deep lake and peat sediments.

Year after year a small addition is made to the amount already accumulated, and each year a new "pollen rain" makes its contribution to the accumulating sediment. Thus a chronological record is made of the species of trees which constitute the forests of the region.

As long as climate remained the same no change or only minor change occurred in the forest composition. But we know now that striking changes in climate took place in America. Changing climate is indicated by appearance of more southern species. Also in reduction in the number of pollen grains of species which had, up until that time, contributed most of the pollens. In this manner, we can trace the changes in forest composition from the first tree invaders to the present time.

In the field, a pollen analyst uses a so-called peat borer of which there are two types. One works like a punch to cut a sample of sediment at a given depth. The other (Hiller type), of Swedish origin, operates by aid of a movable sleeve over a cylinder, with an opening on one side. With this a field worker may obtain samples at a half or one-foot intervals.

The samples are placed into small bottles or vials, which are labelled as to location and foot-level. In order to prevent contamination, the borer is washed after every sampling. The deepest bog ever bored by the writer was fifty-nine feet. This was in

northern Indiana.

The analysis part is a laboratory problem. A small amount of the peat sample (about the size of a garden pea) is put into solution in 10 cc of 95 percent alcohol by stirring until the sediments are well separated. A little gentian violet is added. This

(Turn to page 43)

At his desk at Butler University, the author examines a completed pollen profile, or pollen count expressed in terms of percentage



Readers who last October enjoyed "Biltmore Days," John B. Woods' delightful story of the days when Biltmore Forest School was the seat of forestry learning in this country, will not want to miss this chapter in the saga of Carl Alwin Schenck's Class of 1912

Biltmore in GERMANY



By JOHN B. WOODS

T IS not to be wondered at that even as late as 1912, the Biltmore Forest School spent half of its twelve months' course visiting German centers. American forestry was still very young, looking to Europe for much of its inspiration and most of its techniques. Leaders such as Pinchot and Graves traveled to Germany for training in the new profession, while Fernow and Roth actually were Teutons by origin and education. Though forestry was well advanced in France and the Scandinavian countries, it was widely acknowledged that the foresters of certain of the German states led in both theory and practice. Even that great Oxford teacher, Sir William Schlich, was wont to conduct his students to the Fatherland for much of the instruc-

tion he gave. Carl Alwin Schenck, who founded the forest school at Biltmore while employed as managing forester for that great estate in western North Carolina, was German too, and actually accredited to the Hessian State Forest Service. He remained in nonactive status by reason of being absent in America for much of the time during fifteen years or more, yet it was natural that upon severing relations with the Biltmore estate in 1909 he should decide immediately to take his students to Germany and particularly to his old stamping ground, Hesse-Darmstadt, for study of the

Biltmore students study a stand of silver fir in the Thuringer Wald

AMERICAN FORESTS



Visiting Germany again in 1928, the author found Dr. Schenck (right) with a Hessian forester near Beerfelden



Favorite of Biltmore students was Oberforstmeister Krutina (left) at Heidelberg. Dr. Schenek is in center

object lessons in forestry there offered.

Thus the school was given its peripatetic aspect and possibly its greatest lure, for what boy would not rise to the bait of six months' travel through famed Old World forests. It is to his credit that upon return to America, Dr. Schenck strove with equal seriousness to search out and present the most illuminating object lessons in American forest management, bad as well as good.

The fourth annual pilgrimage to Germany began for Biltmoreans on October 1, 1912, at the Holland-America Line docks in Hoboken. Some fifty students, forty of them veterans of the Pacific Coast trip and the others newcomers, climbed aboard the venerable steamer Nieuw Amsterdam and set about making themselves at home.

Of all the ship's excellent company, from Master to pink-cheeked cabin boys, the two who stand out most clearly in memory are Ronnck, deck steward and Vredonk, barman. With unfailing courtesy they gave suitable answers to a million questions, covering an astounding range of human interests unrelated to forestry, and in general prepared us to cope with an adult Europe. Later we were to meet two other Europeans of comparable station who proved equally deserving of our gratitude: Haubl, billiard master at the Hotel Hess in Darmstadt, and the waiter, August Wolfram, who gave us sound advice, cashed our checks and loaned us money without interest when the checks were slow in arriving.

Life aboard ship soon settled into a strict routine of morning lectures, afternoon study and diary writing. followed by deck-sitting and late dinner. In ten days the Nieuw Amsterdam tied up at Rotterdam and the group went for a night to the old Hotel Coomans, before taking an early morning train across Holland and up the Rhine. During the day there were brief stops at Koeln and Mainz, permitting short strolls in the vicinity of the railroad stations. At storied Bingen we learned that the lovely ancient Rhine town was no more justly celebrated because of that "Soldier of the Legion" who "lay dying at Algiers," than for a prosaic but huge creosoting plant which treated all manner of railway and dock timbers.

In early evening we detrained at a small village called Bensheim, still in the river plain, where a truly colossal meal was placed before fifty hungry young men and the school staff. Even after the lapse of thirty-six years the memory of those vast golden Pfannkuechen lingers pleasantly. In Bensheim we had our first encounter with the German feather comforter as bedclothes; too short at both ends they were, and certainly no comfort when slipping to the floor. Next morning there was an early call for all luggage, to be loaded on archaic wagons and hauled away. We followed afoot soon after, over the hills a matter of fifteen kilometers (nine miles) to Lindenfels in the Odenwald.

This hill region with its ancient oak and beech forests was a marvelous place to visit in the fall of the year, when almost every night there was

observance of some feast by the friendly hill folk, and days were golden with sunshine and autumn foliage. Actually, Odin's Wood consisted of numerous small and larger patches of hardwood tree growth in various stages of decay or rehabilitation. Long ago the Bohemian glass blowers, traveling artisans who roamed over most of Europe from late mediaeval to modern times, destroyed much of the beech to furnish charcoal for their operations. Then followed heavy cutting of oak and other timber tree species for lumber, shingles and fuel. Unregulated grazing of cattle and removal of leaves by dwellers in nearby villages for use as fertilizer played their parts in causing the decline of this once noble and celebrated woodland. It is interesting to note that in 1912, the State of Hess was systematically buying up remnants of private holdings in the Odenwald region, in order that there might be unified, intelligent management of the whole forest area. And the villages, many of which owned small parcels of communal woods, had turned the management of their lands over to state foresters by special arrangement.

There were ruins of a mediaeval castle crowning a hill just outside Lindenfels, and here was held the first Saengerfest of the European sojourn in 1912-13. Hessian foresters were present, as were a group of Wandervoegeln, or students on a weekend hike. These young Germans happened in as we were drinking our beer and singing our songs. Carry-

ing various instruments and displaying no little talent, they soon took over the entertainment, to the delight of the none too musical Yanks.

Forestry field trips in the Odenwald dealt with regeneration, botany and timber examination. Possibly most interesting to us were plantations of American tree species, notably white pine and Douglasfir, yellow poplar (tulip tree) and even hemlock. Life was pleasant there, but could not last forever. Late in October, Dr. Schenck led his band on a hike to Darmstadt, a matter of thirty kilometers (eighteen miles), thus emphasizing one of his favorite and frequently repeated axioms, that foresters need strong legs as much as they need brains.

Settling down in the capital of Hess-Darmstadt was a matter of engaging rooms, breakfast included, mostly in private homes, and foregathering at the Hotel Hess each evening for dinner and conversation before going home to study. The region round about was nearly one-third forested, large areas of city, state and private woodland affording opportunity for both study and pleasure. While Scotch pine predominated, this section of the Rhine Plain contained literally dozens of species in middleaged planted stands, including a good number of Americans. At that time it was claimed, presumably with reason, that the oldest plantation of North American white pine (called by the Germans "Weymouth's Kiefer") anywhere in the world (130 years from seed brought back by a Hessian officer who fought for George III) stood near Trippstadt in the Palatinate.

By and large, however, the Scotch pine plantations were most interesting, because they constituted parks for the people of this city and its suburbs. Many miles of wide trails wound through the groves and beer gardens were suitably situated for rest and refreshment. The origin of this forest was a bit on the prosaic side, for the Hessian foresters had scattered many wagon loads of pine cones upon the ground and then caused bands of sheep to be driven back and forth for weeks so that their sharp hooves would punch the loosened seeds into the sandy topsoil.

Darmstadt, being a provincial capital, was the home of the Grand Duke, five regiments of troops currently in training, a state opera and various institutions of higher education, not to mention the legislature and state offices. Hessians of the officer caste affected monocles and occupied at least their share of all the sidewalks, although they appeared less arrogant than Prussians and did not insist that civilians walk out in the street.

So much military accent was strange to Americans. It would not be correct to claim that we sensed the nearness of world conflict, but we did feel that the Germans were spoiling for a licking, which we quite erroneously thought would not be too difficult to give them. Overhead we frequently observed a military airplane of the type called *Taube*, or dove. Certainly they were not doves of peace, then or later.

The "Polytechnicum," so called by way of abbreviation of a pleasing mouthful, Grossherzogliche Technische Hochschule, was a first-rate technical college. Two thousand students took courses there regularly, including Russians, Swedes, Germans and in a somewhat minor way, ourselves. We met these other young men often in the evenings at the famous Ernst Ludwig Cafe, or in the student hall of the Hotel Hess. On the whole we got along well together, although there was one free-for-all in the foyer of the hotel when Americans and Swedes ganged up against the Germans. About all the damage done was the partial destruction of a revolving door.

The Americans carried short courses in microscopy (dendrology), mechanical drawing and the use of surveying instruments at the Hessian school. Also we were shown a great many timber tests by technicians at the testing laboratory.

From the classroom we went out to the surrounding country and ran transit and level lines for map-making, road location and timber cruising. We approved heartily the Hessian system of leaving students to carry on their engineering field work in their own way, for whenever the young aspirant became ennuied with compass lines that would not close or simply wearied of physical activity, he looked about for the nearest beer garden and settled down for an hour's relaxation in the forests.

Lectures by the Biltmore regulars, Schenck and House, were given in a two-story building leased for school headquarters. Upstairs was a large classroom and on the first floor was a laboratory filled with American lumber of various species and shapes, wood sections and tools for conducting courses in scaling, grading, wood preservation and tree planting. The structure was situated only a block or two from the Grand Duke's town palace, a truly impressive estate surrounded by a high wall. And one day as we passed the main entrance driveway, a group of us received a bona fide thrill at being saluted by the Grand Duke as he returned from a spin through the city. Apparently he recognized us as Americans by reason of the flat-brimmed Stetson hats two of our number were wearing, and got a kick out of giving us an unmistakable greeting.

About the time we were well settled in Darmstadt an extended trip was announced. The first stop was in the ancient, world renowned Spes-

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MY FAVORITE TREE

Edgar A. Guest

Famous columnist and poet



I have two favorite trees, and both of them are treasured as living memorials to friends of old. While I have elm, maple, pine, spruce and dogwood trees of which I am fond, the two favorites happen to be an apple and a plum.

The apple tree was given to me many years ago by Clarence Kirby, a fruit tree expert. When it blossoms in the spring I recall Clarence Kirby and the joys we shared through many a year.

The plum tree stands in the same way for another friend. That also was a gift, and reminds me of a beloved Scotsman who loved such things. It was grafted from a plum tree that he cherished.

Guardians of the High Sierra

By HARRY DE LASAUX



THERE is a high mountain wilderness in California where the peaks pierce the clouds and bite into the blue sky; where

ancient glaciers have scratched millions of geologic inscriptions on towering walls of solid granite; where purple lakes, chips off the porcelain of heaven, hide among curved walls of stone; where lush meadows catch the snowmelt and nourish a multitude of streams until they grow into rivers.

This is the High Sierra. Touched only in a few places by road, it is a wilderness to be enjoyed by the hiker

and by pack train.

It was in 1869 that a young naturalist, tending sheep for a living, came upon the grandeur of the High Sierra via the Tuolumne Meadows country. So impressed was he with this breathtaking setting that he determined to see it protected. The young naturalist's name was John Muir, and today the John Muir Trail leads from Sequoia and Kings Canyon national parks to the south through a marvelous High Sierra country extending through Yosemite National Park.

Dedicated to the protection of this great wilderness is the Sierra Club, founded by a group of wilderness enthusiasts in 1890. John Muir was its president until his death in 1914.

Today the Sierra Club carries on in many ways, both civilized and uncivilized. In swanky offices in San Francisco it administers its guardianship in a businesslike manner. But when members of the club hit the trail on one of their wilderness trips, the sedate schoolteacher and the brisk businesswoman, the dignified banker and the solid businessman become rough and rugged trail pounders.

Its annual trail trip is the most exciting of all. Lasting for two weeks, it is masterfully planned both for scenic value and for as many comforts of life as the wilderness will permit.

Usually about 125 people make the trip. Pack trains, with packers, guides and camp cooks go ahead of the hikers each day of the scheduled journey. Thus by the time members straggle into camp, usually a pleasant meadow with soft places to pitch a sleeping bag, camp is all set up.

The Sierra Club on the trail is simply a bunch of stragglers. Some like to whip the nearby streams with a dry fly. Many fuss with color photography. Others just stretch out at mid-day on a carpet of meadow grass and snooze. It's a free and independent sort of life—just as a free and independent mountaineer would like it. There is comradeship around the campfire, and solitude along the trail.

The executive committee planning the trail trip numbers twelve. Every detail of the journey is worked out ahead of time — route to be taken, amount of food, equipment to be allotted each member (thirty pounds to a hiker), and so on.

Some days members hike twelve miles, other days only eight, but usually the short mileage means long pulls uphill. Anyone with average vigor and a little conditioning can make the trip without trouble.

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Trail dust rises as the pack train goes on ahead to make camp for Sierra Club hikers



Photo by De Lasaux



Photos by Gale Monson, U. S. Fish and Wildlife Service The rocky wilderness of Mojave Canyon on the Arizona side of Havasu Refuge is a haven for bighorn sheep

Desert Oasis

The Havasu Lake Refuge stretches for sixty miles along the Colorado River between California and Arizona. Established primarily to protect bighorn sheep and waterfowl, it also abounds in colorful bird life

By GRACE V. SHARRITT

Young egrets near Alkali Beach, Arizona—one of the 237 species of bird life which make their home in this refuge

In the rugged Blankenship Bend region on the California side of the Colorado River, wild burros are still plentiful





LONG sixty miles of the Colorado River's rough, magnificent scenery, bordering the state of Arizona on one side, and California on the other, stretches one of the most unique wildlife areas of the Southwest, the Havasu Lake Refuge. From Topock, Arizona, past spectacular Needles Peaks, Mojave Rocks and Blankenship Bend, then into Havasu Lake and on down to Parker Dam, the river journey through this federally-protected refuge, basically established for waterfowl and bighorn sheep in 1941, is packed with exciting interest to the traveler enthusiastic about primitive

"Look," this traveler is apt to shout, above the noisy din of ducks and geese, "What's that?—and this? —and that?"

Or at least that is what this writer cried on a rare December day last winter, when she made her first trip to the Havasu.

"What's that funny looking fellow perched over there on a mesquite tree?" I shouted.

"Phainopepla," yelled my companion, Gale Monson, manager of the refuge, and ornithologist of note.

"Come again," I laughed, as we bobbed over the waves like the coots around us.

Gale laughed, too. "Phainopepla," he spelled the word. Pronounced like "Fain-o-pepla," the word now made sense. "Silky flycatcher is another name," he elaborated, shutting off the motor. "Feeds on mistletoe."

The handsome black-crested bird, about the size of a cedar waxwing, to whom he is related, turned sharply towards us where we sat below in the boat. He uttered a brief high-pitched call, "Warp, warp," then flew into the

shrubbery along the bank, flashing glossy green-black feathers and white wing patches.

I jotted the description in a notebook already wet with spray while Gale started the motor and pointed the boat towards the middle of the river.

Havasu, an Indian name meaning "blue water," has been little publicized. As a result the refuge's 46,000 acres stretching casually over the desert floor and up into hills, and over the marshes adjoining the Colorado River, have all the fresh delights of an unspoiled vacation spot. The amazing contrast of desert and bright

blue water is in itself a delightful

paradox.

As we passed the Needles, thrusting black points of rock to the sky, Gale pointed to a great blue heron standing on a high pinnacle of rock, like some shadowy Deity, guarding its own. Then a pair of red-tailed hawks caught our attention. One flew in alarm as we steered under the rocks. Its mate, however, refused to budge from a dinner of half-eaten coot. The red-tail's coloration of light belly and breast, dark feathered coat, blended subtly and beautifully with the beige and black shadings of the rocks.

"There are fifteen different species of hawks in the refuge," Gale explained. "This is the northerly range of the rare Harris hawk and the northwesterly range of the zone-tailed

hawk "

I learned that the Harris hawk, the black buteo, with a white rump and a white band at the tip of the tail, begins nesting on the refuge in February. Havasu, by the way, is one of the few places in the United States where it nests, being a tropical hawk

with a range into Texas and Mexico.

Although my December trip was too late for the exciting fall migration of birds, which begins in September and ends in early November in this particular area, I was on the alert for strange birds that might also be taking a pre-Christmas holiday from their usual environments. The rock formations were eerie and weird, in spite of tawny-leafed tamarisk softening the harsh contours, and hundreds of cliff swallows' nests decorating the ledges. All about us was the water with its varied life of ducks, grebes, cormorants, coots and geese, plus a rich yield of desert life on either shore. The scents were stimulating of marsh grass, water spray and desert plant life. An American egret walked

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Eight fine specimens of bighorn sheep scramble single file up a rocky slope. The sure-footed animals are plentiful in the region



KNOWING -YOUR TREES

HAWTHORN

Crataegus species

By WARREN D. BRUSH

THE hawthorns comprise a very large group of small, thorny trees and shrubs widely distributed in this and the Old World, where they are confined mostly to the North Temperate Zone with the bulk of the distribution in eastern United States. From the abundance of their keen, often very long, woody thorns they are everywhere known and generally distinguished from other woody plants. There are probably about 800 species in North America—the exact number is not known because of the difficulty of distinguishing the different species from each other—

or bluntly pointed at the apex, bright chestnut brown and lustrous, and the inner green or rose color.

The hawthorns are typical of open pasture land where they are difficult to eradicate as their sharp thorns protect them from grazing animals. Because of their aggressiveness they frequently take possession of abandoned farm or cleared lands. Later these impenetrable thickets may be gradually invaded by forest trees through the agency of wind and animals and finally, under dense shade, the hawthorn succumbs.



J. Horace McFarland Co.

Low and widespreading, Hawthorn trees are generally less than 25 feet in height with numerous branches

and 90 in China, Japan, Siberia, central and southwestern Asia, and in Europe.

There are more than 150 species of hawthorn in the United States that grow to tree size. Low and widespreading in habit, they are generally less than 25 feet in height with numerous branches and rigid, more or less zigzag branches, round in cross-section and marked by oblong, mostly pale lenticels and by small, horizontal, slightly elevated leaf scars. Light green when they first appear, the twigs later become red- or orange-brown and lustrous or gray. The spines or thorns, which grow at the base of the twigs or leaves, may be stout or slender, short or elongated, and simple or branched and are generally similar in color to that of the branches or trunk on which they grow. The winter buds are small, spherical, and covered by many over-lapping scales, the outer rounded



L. W. Brownel
Light green at first, the twigs
later become red- or orange-brown

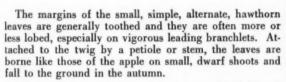


The rigid, zigzag branches are round in the cross-section and marked by oblong pale lenticels and small leaf scars



Dr. L. O. Overholts

The margins of the small, simple alternate leaves are generally toothed and are often more or less lobed



The conspicuous white or rarely rose-colored flowers are similar in appearance and structure to pear and apple blossoms. They are produced in flattish, branched, erect clusters after the leaves are grown. Myriads of insects visit the flowers and assist in their cross-fertilization. The small, spherical, egg-shaped, oblong or pear-shaped, apple-like fruits, bright red, yellow or black, generally open and concave at the apex, are borne in branched clusters. The flesh is usually dryish and unpalatable but in some species it is tart and palatable, and contains from one to five joined, but separable, very hard, bony seeds.

The bark is usually dark or gray, and scaly. The wood is close-grained, hard, heavy and tough. Although subject to warping and checking, it is occasionally used for small tool handles and other turned articles.

Many of the hawthorns are valuable as ornamentals. Their attractive and abundant flowers and showy fruits make them desirable for parks and gardens and when the trees are better known they will be more largely used, especially for screens, borders and hedges. As a hedge plant the hawthorn has been used in the Old World for centuries-the word "haw" coming from the Anglo-Saxon and meaning fence or hedge-and many of our native species are equally if not more desirable as such and are well adapted for trimming. Many of the hawthorns are also very desirable for individual lawn plants, for which a number of cultivated forms are especially suitable, some of them with magnificent red flowers, bright red fruit which remains on the trees during the winter, and leaves that change to orange and scarlet in the fall. The fruit is a favorite food for our native birds and that of several southern species is sometimes made into preserves and jellies.

Both birds and mammals assist in disseminating the seeds and are responsible for their wide distribution. On account of their thick shells the seeds are slow in germinating, often "lying over" for a season.



Dr. L. O. Overholts

The white or rarely rose-colored flowers are similar in appearance and structure to pear and apple blossoms



W. L. Drake

The small, spherical apple-like fruit is bright red, yellow or black and is borne in branched clusters



The bark is usually dark or gray, and scaly. The wood is close-grained, hard and heavy and warps easily

River bottom sculpture proved to have a modernistic motif. The smoothly-tooled rocks had a strangely beautiful bluish color

The dried-up river bed was honeycombed with pothole dens, some as large as small living rooms, and numerous hidden passageways



When a River Runs Dry

By JOHN D. KENDIG

Undercover work going on for hundreds of years was exposed when portions of the Susquehanna River dried up, exposing secrets of the river bed

When there is no rain for a long time and a river runs low, interesting and often little known objects are apt to come to the surface. The water goes down and little by little the river bed appears. Secrets hidden for centuries are suddenly brought to light and the stage is set

for a geologist's field day.

In the exceptionally dry period of October 1947, the residents of Falmouth, Lancaster County, Pennsylvania, became aware that the Susquehanna River was unusually low. Out there in the river bed, just below the Conewago Falls where a ridge of hard basaltic rock crosses the stream, there appeared a strange area of interesting and oddly sculptured rocks, covering a section nearly a mile square. Upon investigation it was found that scattered throughout this queer rocky land were thousands of potholes of many types and sizes. In all probability this was one of the finest displays of these geological formations in eastern United States.

A timely article in the local newspaper aroused immediate interest and soon flocks of people were gathering to see these unusual natural curiosities. On the Sunday following the article's appearance about 10,000 people were reported to have visited the rocky lands at Falmouth, and cars were lined up along the main road for a distance

of two or three miles.

Dr. Samuel Simons of Marietta, had known that the potholes existed here and had been watching them for many years but, until the present low water stage of the river, had had no idea of the great extent of these rock formations. Dr. Herbert H. Beck, naturalist and specialist in Lancaster County history and science, also explored the area and pronounced it a most unusual exhibit.

The writer came to Falmouth with the others and ranged over the low rocky bed of the river. It was a morning to remember as the heavy mist cleared away and he found himself in a wilderness of rocks—old and water worn, strangely and fantastically shaped, large and small, and everywhere filled with numberless potholes. Some of the holes had a machine-tooled uniformity and perfection. But

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Biltmore in Germany

(From page 24)

sart a forest of white oaks that dated from the Middle Ages. Having survived the Thirty Years' War by reason of being owned by the tough and vigilant Bishops of Mainz, and later having come into possession of the equally possessive royal house of Bavaria, these great oaks, known to vield the softest textured veneer found anywhere in this world, seemed destined to stand forever. Each tree was watched over and a record was kept of its volume and rate of decay. so that it might be harvested if and when its overall value should begin to decline. Foresters strove to keep these trees healthy by "wrapping them in beech," meaning that a high understory of beech was grown among the oaks, to enrich the soil and serve as windbreaks. And still other understories of white oak were started by direct seeding of recurring mast crops.

The stay at Rohrbrun, a crossroads in the Spessart, with its splendid Forstmeister's house, identified by the great stag-head on the front wall, and its tiny inn where roebuck steaks and roasts were served every day of the week, was full of interest, giving as it did the flavor of real, large-scale German forestry. This forest was home to the wild boar herd of the mad King of Bavaria, and it was said that the Prince Regent came here frequently to hunt. Hiking through the deep woods in the fading light of late afternoon, as we did on occasion, it seemed the part of wisdom to steer away from little bands of those wicked looking pigs. As a matter of fact, the Bavarian state foresters did not care for them either, because they tore up the ground and did much damage to hardwood reproduction. Here was a grazing problem posed by pigs!

From hardwoods the scene shifted to spruce and fir, in the Frankenwald of northern Bavaria. The ancient walled city of Kronach was our headquarters. This was where the doughty Swede, Gustavus Adolphus, once upon a time, was stood off by irate women and old men who threw boiling water and hog-fat down upon him and his invasion horde. At a later date Napoleon spent a night at Kronach, going forth next day to fight and win the Battle of Jena. However, it is possible that on the grand average this city was most famous for being the center of a timbergrowing and river - driving setup which had been admired by foresters and timbermen for more than 300 years. Streams had been walled with matched rock and fitted with splash dams so that large volumes of wood in the log could be floated down to market with unbelievably small quantities of water.

After Kronach the school moved on to Saxony, still another German state. Now the young Hessian forester who accompanied us began to hum an old ditty that went, "Sachsen, liebe Sachsen, wo die schoene Maedeln wachsen," and everybody perked up in expectation of a livelier environment than had been afforded by

northern Bavaria. Dresden was the jumping off place for a trip to Tharandt, where the Saxon Forest Institute, first school for teaching higher forestry science, was established by Heinrich von Cotta in 1811. On the hill back of the college a grove of eighty oaks flourished in memory of his works, planted by students after his death at that ripe old age. In the school we listened to leaders in Saxon (and European) forestry, and came in contact with various ideas which later were to make forestry history. For example, here were being begun experiments in subjecting growing trees to sulphur fumes, a problem no less important to certain mining regions of North America than to the Saxon-Bohemian border country, where the investigation was inspired. Here also were to be seen some of the earliest results of efforts to cruise standing timber by photography from aircraft.

The Erzgebirge or Hartz Mountain region was visited next. Lying along the border with Bohemia, it constituted a natural timber growing territory, dotted with saw- and pulpmills, also with mining and smelting installations which produced fumes inimical to vegetation, particularly spruce and fir trees. Most of this forest was the property of the Saxon Crown, and was managed by clever and resourceful foresters who appeared to enjoy the knowledge that they were forever under the scrutiny of the demon theorists and high-pressure experts of Tharandt.

Just before Christmas we spent a week at the Prussian Forest Institute, at Eberswalde, north of Berlin. Here we were treated to another set of new ideas and met another group of leaders of forestry thought. One of their current preoccupations was with forest genetics and the growing scandal of misshapen and generally low-grade Scotch pine trees then appearing in many European plantations. Out of that to-do came eventually insistence by most European foresters upon certification of tree seed sources.

Turned loose on Christmas Eve, we scattered far and wide for the holidays. Six of us went to Switzerland and tried the winter sports at Ober Grindlewald, while others got as far as Paris, Rome and Saint Petersburg. On the eve of Armageddon, travel in Europe was easy as could be.

January was an interesting month of that long ago winter. There were visits to tall, friendly Oberforstmeister Krutina at Heidelberg. He was known to everybody in the Univer-

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OLDEST LOGGING CONTRACT

By Jasper P. Sinclair

LOGGING is one of the oldest industries in the white man's history of America. There is no doubt about that, because the log cabin and log stockade of the first settlers have become the symbols of American colonization.

The industry points a prideful finger to a logging contract made between the Pilgrims and their peaceful Indian neighbors as the first agreement of its kind in the New World. Perhaps it is, but you can turn to the Bible for mention of the first logging contract on record anywhere.

The world's first logging contract is undoubtedly that whereby Solomon contracted with Hiram of Tyre to furnish the logs for the building of Solomon's fabulous Temple. A group of Western lumbermen recently sharpened their pencils and wits and sat down to a little figuring on this biblical contract.

After checking biblical measurements and money values as well as they could, the curious lumbermen concluded that Hiram of Tyre had charged about \$9.50 per thousand board feet for the timber that went into the construction of Solomon's Temple. It was a bargain price considering that there was no competitive bidding on the job.

Those Curious Cycads

Commonly known as sago palms, these "living fossils" have been cultivated by the Japanese into grotesque shapes mindful of a prehistoric age

By ZELMA GOSLEE LOCKE

YCADS seem to have been cultivated in Japan long before they were brought to Europe. Their common name is "sago palm," because the seeds and stems contain a great deal of starch. They really are more closely related to large tropical ferns than to palms. Their fern-like rigid leaves are used widely as decorations.

The mural, "Cycads in a Temple Garden," recently installed at the Chicago Natural History Museum, shows the largest cycads that are known to grow in Japan. The largest tree in the mural is over twenty-five feet tall and its diameter at the base is five feet. The branched trunks in the background are due to injury induced during early growth.

The skill of Japanese gardeners has produced striking horticultural variations. One of these is the "lion'shead" variety, which is purposely dwarfed and may have as many as twenty crowns of leaves.

It's difficult to estimate the age of cycads. Crowns of leaves may last from one to several years, depending on the local climate. The armor of leaf bases that remains after the leaves drop thus provides only an indirect and rather unreliable basis for determining age.

While woody flowering plants of temperate areas produce fairly regular rings of annual growth, the cycads don't. However, their relatively slow growth suggests considerable age. Indeed, these "living fossils" may be hundreds of years old.

The cycad's leaves may be over two feet long and have many small leaflets, giving it a fern-like or palm-like appearance. The leaves keep fresh for a long time because of their leathery texture.

"Often specimens grown in greenhouses produce remarkable coralloid masses on their roots above ground. These distorted structures contain at their tips bacteria which intensify the distortion of the roots and prepare the way for the entry of another micro-organism, a blue-green alga," explains Dr. Theodor Just, chief curator of the Department of Botany of the Chicago Natural History Museum. "The latter multiplies profusely and forms a zone of easily visible growth below the outer layers, if one takes the trouble to section such a tubercle. This type of root growing upward, unlike the regular roots, occurs in all cycads, although it is more readily seen in plants grown in greenhouses than outdoors.

"An outstanding feature of all cycads is the absolute separation of the sexes on different specimens of the same species. Generally the reproductive structures of cycads are grouped together either loosely as in this species or in a more compact form ordinarily referred to as cones or strobili. In Cycas revoluta, the female reproductive leaves look somewhat like smaller editions of the real leaves, bearing usually three pairs of ovules below the leafy portion. These so-called sporophylls are found at the tip of the plant and are spirally arranged like the regular leaves forming the crown below them.

"This condition of loosely arranged sporophylls is regarded as the most primitive arrangement from which various stages of reduction of the leafy parts lead to the compact type of cone found in the male plants of this species as well as most of the other members of the family. Although at the beginning the female cones of Cycas revoluta are covered by yellowish hairs, these disappear gradually and the seeds have a soft orange-red color."

There are other members of this family of "living fossils" and though more widely distributed in the past, they are today found in subtropical and tropical regions except for the genus Cycas in Asia and the American genus Zamia which reaches southern Florida. Their greatest concentration is in Mexico and the West Indies in the Western Hemisphere and in Australia and South Africa in the Eastern and Southern Hemispheres.

They grow in remote locations and are often quite local in distribution.

The sago palm's great hardiness makes it a popular outdoor plant in such areas as the Gulf of Mexico, southern California, and the Mediterranean.

A new mural recently installed at the Chicago Natural History Museum shows Japan's largest cycads—25 feet tall with a diameter of five feet

Chicago Natural History Museum





Margaret Lowe and some of the products from her woodworking shop

sas walnut, with its smooth satiny feel and attractive grain. Much of this comes from a grove owned by the Lowe family, members of which have been engaged in cabinet making

Most popular of her woods is Kan-

for three generations. Other domestic woods used are pear, apple, persimmon, box elder, maple and cedar. Many of these trees grow along the Neosho and Cottonwood rivers near-

by.

The use of imported woods has made possible the reproduction of intricate flower designs on pins and emblems requiring accurate color blending. To walnut, gum and holly, with which she first experimented. Miss Lowe has now added 125 other varieties of wood, matching or harmonizing with practically all colors found in fabrics. No stain or dye is used on any of the woods except the blue, since there seems to be no timber with a natural blue tone.

Amaranth, from British Guiana, is noted for its intense purple color.

Stories Told in Wood

By MARGARET WHITTEMORE

East India furnishes yomawood, varying from pale red to light tan. Zebra wood from Africa is striped in tan and brown; and the light brown iroko from the same country is relieved by a slight peppery effect in darker shades of brown.

With a wide variety of colors obtainable through these various woods, Miss Lowe has been able to reproduce flower designs in their natural shades. Other subjects having wide appeal include animals, birds, trees, children, sports, tropical and western

Each piece is hand-finished, and is handled about twenty times before it is completed. Five or six craftsmen cooperate in making a single pin cutting overlay designs from strips one-twentieth of an inch thick, gluing them to the wooden base, shellacing, polishing, and so on. Miss Lowe keeps her eye on every piece and her designs fairly animate the wood from which they are cut.

Miss Lowe's woodcuts find a ready market in gift shops and department stores in the United States



From Pennsylvania Dutch ances-

tors, famed for their Conestoga

wagons and painted chests, Margaret

Lowe of Americus, Kansas, inherited

a talent for working with wood. Dur-

ing her early twenties she busied her-

self in her father's cabinet shop cut-

ting little pictures out of native wal-

nut. Such was the beginning of the

thriving business now known as Mar-

house, now enlarged to four times its

original size, hums with a score or

more of electrically-driven jig saws

and other machines. There is no other

industry in Americus, and all of the

workers are Margaret's friends and

neighbors-eighteen girls whom she

has instilled with her own excellent

craftsmanship. In addition to silhou-

ettes, her products include overlay

plaques, costume jewelry, guest logs,

photograph albums and book ends.

all made of wood. They find a ready

market in large department stores and

gift shops throughout the country.

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NEWS IN REVIEW

An early August outbreak of lightning fires in the Northern Rocky Mountains provided the backdrop for one of the worst tragedies in U. S. Forest Service fire-fighting history. Thirteen veteran fire fighters lost their lives on the afternoon of August 5 while battling a blaze on the Helena National Forest in Montana.

Twelve of the victims were smokejumpers (see "The Making of a Smokejumper" in AMERICAN FORESTS for August), the other a veteran ground fighter. Only three of the fifteen smokejumpers from Missoula to land safely near the fire (it then covered only ninety acres, later spread to nearly 6,000) survived. Forest Service records show that all of the jumpers were veterans of at least two seasons. One had eight years' experience, another forty-one jumps. They had fought the fire for two hours before tragedy struck.

It came suddenly at 5:30 in the afternoon in the form of a fierce wind, springing up from the "wrong" direction. Flames enveloped the fighters in a matter of minutes. Among the victims was Bill Hellman, one of four smokejumpers who on June 28 took part in a televised fire prevention campaign jump in Washington, D. C. (see AMERICAN FORESTS for August). Hellman is reported to have died in a Helena hospital as a result of burns incurred in efforts to aid his fellow fire fighters.

A nineteen - member citizens' committee, appointed by Secretary of the Interior J. A. Krug, chairman of the United States Group for the United Nations Scientific Conference on Conservation and Utilization of Resources, was assigned the responsibility of making arrangements for the Conference which opened August 17 at Lake Success, New York. Included on this committee as chairmen of subcommittees were two AFA directors.

Randolph G. Pack, AFA vice-president and president of the Pack Forestry Foundation, headed the subcommittee on forestry. AFA Director Kent Leavitt, who is also president of the Association of Soil Conservation Districts, served as chairman of the subcommittee on land. Other subcommittee chairmen included: Columbus Iselin, director of Oceanographic Institution, in charge of marine and

wildlife; John Suman, vice-president of Standard Oil Company of New Jersey, assigned to fuel; James Douglas, secretary of Phelps-Dodge Corporation, chairman on minerals; Philip Sporn, president of American Gas and Electric Company, responsible for energy; and Thorndike Saville, dean of School of Engineering, New York University, chairman on water.

The conference will provide a forum for discussion of aid to friendly foreign nations and will afford an exchange of experiences in the techniques of resource conservation and

The likeness of Jav N. "Ding" Darling, famous cartoonist and conservationist, may appear on the 1951 duck stamp, if "Ding's" fellow Iowans and other friends in conservation circles have their way, according to the National Wildlife Federation, "Ding" was chief of the old Biological Survev (now the U.S. Fish and Wildlife Service) when the Duck Stamp Act was passed in 1934. He designed the first duck stamp which is now a collector's item. If the Post Office yields to the pressure in "Ding's" behalf, it will be the first time in our postal history that a living American has been so honored.

The Alaska Game Commission predicts that white sheep and barren ground caribou, found under the U. S. flag only in Alaska, may soon become extinct. The giant Alaska moose is also reported to be fighting a losing battle for existence. The Commission has called for a larger wildlife lawenforcement staff, more wildlife research, an expanded predatory animal control program and increased federal funds for wildlife restoration.

The appointment of Richard Borden of Boston, as executive director of the National Wildlife Federation has been announced by David A. Aylward, its president. The post was newly created to integrate the expanding activities of the Federation. Borden is chairman of the conservation committee of the Boone and Crockett Club, and is a nationally recognized wildlife photographer.

The newly organized Washington State Institute of Forest Products has now completed its staff, according

to Director O. Harry Schrader. A recent appointment makes Ralph De-Moisy, formerly assistant professor of Forest Engineering at Oregon State College, the executive assistant to Dr. Schrader. John Allen, formerly forester for the Nettleton Timber Company, has been appointed technologist. The Institute's purpose is to provide means for closer utilization of forest resources of the state and as a clearing house for information on improved methods and equipment.

A rise in collections from the sale of resources and the rental of lands on 152 national forests throughout the country brought total national forest receipts in fiscal year 1949 to an all-time high of approximately \$31,023,500, the Forest Service has announced. This represents an increase of twenty-eight percent over the \$24,236,431 taken in during fiscal year 1948.

With about eighty-six percent of the national forest receipts derived from the sale of timber, uncertainty regarding the trend of the lumber market during the last few months has affected somewhat the earnings reported for the year just ended. Four of the ten Forest Service regions showed a drop in collections due principally to a decrease in timber sale receipts. These reductions, totalling \$200,000, centered in the northeastern area from Maine to Kentucky, in the north central states, in the central Rocky Mountain area, and in Alaska.

Offsetting this slight decline were increased receipts from the sale of high-grade virgin timber in the national forests of the Pacific Northwest and California. Washington and Oregon reported increased receipts from timber of approximately \$2,485,000 over the \$9,694,735 taken in a year ago, while California timber collections rose \$2,235,000 over last year's collections of \$1,822,789. Also reporting increased receipts were the fast-growing pine areas of the southern region, comprising the eleven southern states south of Virginia, which in 1949 collected \$5,546,500 from the sale of timber as compared to \$4,058,455 in 1948.

Second to timber sales, which netted the Forest Service approximately \$26,940,000 during the year ended June 30, are collections from grazing fees. In fiscal year 1949 some \$3,275,800 was collected for pasturing of cattle, horses, sheep and goats on national forest land, an increase of \$377,485 over the \$2,898,315 received in 1948. Other miscellaneous sources of national forest income such

as oil well leases, strip coal mining, summer cabin sites, recreational developments, etc., this year brought in about \$720,150, and the rental of water power rights netted \$87,567.

National forest receipts are deposited in the Federal treasury. Twenty-five percent of this total, with a few minor exceptions covered by special legislation, will be returned to the states for distribution to the counties in which national forests are located.

The Third World Forestry Congress, meeting in Helsinki, Finland, ended July 22 on a note of enthusiastic international cooperation. Called at the suggestion of the Food and Agriculture Organization of the United Nations, the Congress unanimously adopted a report containing technical suggestions and including general recommendations affirming the belief that each country should have a sound forest policy involving legislation, research, education, and professional training. The report also recommended that FAO prepare a statement on basic principles of sound forestry for the consideration of member nations and that the FAO Annual Conference, meeting in Washington, D. C., in November of this year, explore what further steps are needed for this implementation. Unanimous approval included that of the delegations from Russia, Sweden, and Argentina, countries who are not members of FAO.

The Congress was regarded as a great success and the work was carried out by delegates representing almost ninety percent of the world's forest area.

The Argentine Government has offered to act as host for the Fourth World Forestry Congress, to be sponsored by FAO.

A forest-game management program correlated with the U. S. Forest Service timber management program has been started by the North Carolina Wildlife Resources Board on the National Game Preserve of the Pisgah National Forest.

Under present plans, approximately ten percent of an aréa of 60,000 acres will be clear-cut every ten years on a 100-year rotation. Cuttings will be made in blocks up to 100 acres, well dispersed through the management area. To insure forest reproduction, seed trees will be preserved. The Forest Service, with Knutsen-Vandenberg funds, will improve the clear-cut areas for forest regeneration. Using Pittman-Robertson funds, the Wildlife Resources Board will then treat the cutting area further for

game production.

Most of the cost of game management will be derived directly from the sale of timber and forest products, and a maximum amount of each type of food and cover for forest wildlife, consistent with good forestry, will be produced.

Arthur T. Upson, since 1943 director of the Tropical Region of the U. S. Forest Service, and general superintendent of the Insular Service Forests of Puerto Rico, will be assigned to special forest utilization work at the California Forest Experiment Station at Berkeley. He is succeeded in the Puerto Rican post by Henry B. Bosworth, supervisor of the Texas National Forests.

Bringing with him a wealth of technical and administrative experience Mr. Upson is well qualified to handle the new California job which will consist primarily of studying and stimulating plans and action for more complete and better utilization of wood material in the state. He has served twenty-seven years with the U. S. Forest Service, one year with the War Production Board, and eleven years with the National Lumber Manufacturers Association.

Armed with bog-borers and isotopic instruments, an expedition of scientists is probing the bogs of the Quetico-Superior country in Minnesota and Ontario, to trace the history of the region since glacial times (see "Reading Tree History in Pollen Dust" on page 21).

Led by Dr. J. E. Potzger, wellknown biologist and paleobotanist, the expedition is being made under the auspices of the American Philosophical Society and the President's Quetico-Superior Committee in cooperation with the U.S. Forest Service. Pollen samples will be taken at various depths throughout the region for laboratory analysis. By examining differences in atomic structure of pollen samples, Dr. Potzger believes the date of deposit can be determined. This will enable scientists to trace climatic changes through the centuries, to determine the mean temperatures for specific geological times, and to compile a complete paleological history of the area.

Walter B. Garver of Chicago, has been appointed manager of the United States Chamber of Commerce's Agricultural Department, succeeding Delos L. James who recently retired. Plans for extending the scope of the department have been made.



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Greece

(From page 17)

graze in the high mountains long after snow arrives and continue to thrive. Reforestation and a roving goat population are, however, simply incompatible. The policy now is to fence in advance of forest planting with barb wire and steel posts. Plantations are protected for a period of three to four years, or until the trees are two to three feet high, when the fence can be moved to another planting site. These planted areas will then be grazed with a better class of stock -cattle or sheep-with restrictions as to numbers. The fenced plantations visited showed that, on reasonably good sites, areas so protected for one or two years developed excellent natural stands of clovers, vetches and grasses. Prior to fencing, such areas had been grazed to the grass roots. In these areas, of course, it will be only a question of time on the better sites until the crowns of the trees will close and eliminate much of the grazing.

Some years ago, legislation was passed which forbade the grazing of goats except by the owner on his own land. This legislation was found impracticable of enforcement, since, as stated, the Greek peasant simply cannot exist without his goat herds or an acceptable substitute. Another favored proposal is to replace the present goat with a better type of goat-an animal which will produce more milk and meat, so that fewer will be required. With supplemental feeding such animals could probably be restricted to improved pastures. These two suggestions appear to be the most feasible solutions to the goat problem.

One thing is certain, it is useless to expect the reforestation program to be successful unless the goat situation is corrected.

As a group, Greek foresters are well trained. Most of the men occupying key positions received their forestry education in Germany or Austria. Uniformly, they speak French and German, while a few speak English. The forest rangers and their assistants are largely graduates of the Forest School of the University of Salonika and, incidentally, English is now required there. Some of the nurserymen are technically trained.

Foresters are poorly paid, but this is not peculiar to foresters; it is true of most technicians. Salaries range from a fifth to a sixth of what comparable positions would pay in this country. Unfortunately, the cost of many articles in Greece is not in line with the salary scale. A shirt costing \$5 in this country will cost \$9.50 in Greece, and the same is true of a good pair of shoes. Therefore, unless a technician has independent means it is necessary for him to try and fill two or three jobs at the same time.

One cannot live long in Greece without developing a wholesome respect and liking for the Greek people, particularly the peasant class who have borne the brunt of her national disasters. I had many opportunities to visit with the peasants in their villages and they proved to be a cheerful, hospitable, hardworking people. They have a warm spot in their hearts for Americans, which is understandable in view of the assistance we have given them. But it goes deeper than that. Nearly every village has at least one citizen who has lived in the United States, sometimes for as long as fifteen years.

For the most part, these citizens had returned to Greece to visit relatives and friends, often an ailing, aged mother. Others came to prospect for a wife. In the majority of cases they overstayed passport limitations, due to a variety of reasons, such as prolonged illness, a hesitant sweetheart, or dissipation of funds, and were forced to remain in the fatherland. These transients to our shores have done much to picture to their friends the wonders of America and the character of its people.

Greek recovery is greatly handicapped by the fact that she has such a dearth of natural resources. She has no known oil or gas supply, only a limited amount of very poor coal, small iron deposits and these as yet undeveloped, meagre forests and a rather mediocre marine fish life. Her agricultural lands are badly overpopulated. Farm tracts have been divided and subdivided to take care of sons and sons of sons to the point where further division is not feasible.

The situation would seem to demand the establishment of comprehensive industries which would draw people off the land. It is difficult, however, to interest capital in the establishment of industry in a country so short of raw materials. Greece has some good waterpower possibilities and she has cheap labor. These two factors may offset to some degree her meagre natural resources.

But first of all, something must be done about the present unsettled condition of the country.

High Sierra

(From page 25)

They are a practical group. No armchair conservationists, they preach conserving the wild beauty of the High Sierra by getting out and enjoying it themselves. And they've done a good job of it. They fight hard, relentlessly, aggressively.

California's great High Sierra rises to over 14,000 feet. Mt. Whitney, highest peak in continental United States, is in the High Sierra wilderness. The great Kings River, along with the Kern, Merced and Tuolumne rise in the 8,000-foot meadows where once gigantic glaciers grew and finally slid downward, to form those magnificent domes of solid granite.

It is this amazingly beautiful High Sierra country that is America's for exploring. And a just share of the credit for preserving it belongs to the Sierra Club.

Growing Quality Hardwoods

(From page 13)

lower grade logs, predominantly red and post oak, with some sweet gum, tulip poplar, elm, red maple, birch, sycamore and black gum.

It was agreed that future cuts would be made at five-year intervals, with the volume to be based on rate of growth.

Prior to the initial cut, the stand was composed principally of red, post and white oak, sweet gum and tulip poplar. Minor species were hickory, black gum, elm, red maple and sycamore. The improvement cutting was made to cut out the post oak as far as practical, due to its slow growth and low value. All post oak, elm, red maple and black gum which had one merchantable log were cut. Of the most valuable species, such as red and white oak, tulip poplar and sweet gum, only the trees which had practically stopped growing, or which were interfering with other better quality trees, were marked for cuting. Large cull trees were girdled.

The tree farm following cutting averaged 2,200 board feet an acre. The growth rate is now 225 board feet annually an acre. Therefore, during a five-year period this 200 acres will be growing 225,000 board feet of quality hardwoods. By taking out the lowest quality trees during each successive cut, the tract will produce a constantly improved quality of logs. This means more money for the tree farmer and a better quality product for the manufacturer.

From the company's standpoint benefits resulting are:

1. Raw material sources have been

The Douglasfir, transplanted from Oregon to The Netherlands to bring new lifeblood into the partially denuded forest sections of the country, is doing so well in Dutch soil that it may well become the principal factor in the Netherlands reforestation program.

established. Tree farmers want to sell future tree crops to the company.

2. Tree farm contents are known. Growth rates are known. A place to get desired species has been established. The tree farmer pays taxes on the land.

 The good will being established for the company by this method of cutting. This is the best form of advertising.

4. Saving in not cutting small logs which do not pay their way.

 General conservation of timber supply, and raising of quality logs which is essential in producing quality products.



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Plan to attend the American Institute of Park Executives Convention, Detroit, Mich., September 20-23.

An Opportunity to Pay Tribute to Fire Heroes



The American Porest Fire Medal Board recognizes outstanding cases of heroism in fire fighting by awarding the Medal illustrated above. The Board consists of a representative of The American Forestry Association, Society of American Forestry Foundation, Association of State Foresters, American Forest Products Industries, and the Canadian Society of Forest Engineers.

To establish this Award on a permanent basis, a fund of \$3,000 is planned. Cash balance on hand totals \$2,930. Your assistance in completing this fund is invited. It is believed that foresters, forestry, park, and forest protection associations, and other conservation groups, will welcome the opportunity to contribute. Send contributions to:

THE AMERICAN FORESTRY ASSOCIATION

919 SEVENTEENTH STREET, N. W. WASHINGTON 6, D. C.

Longhorns

(From page 11)

are also several handsome young steers coming along that have blue in their hides.

"Even those of us who live on the refuge are fascinated by the Longhorns," Greenwalt declares. "The big steers have majesty, dignity, independence and fearlessness. Some of our big 1900-pound beauties with horn spreads nearing six feet, and just about old enough to vote, loom like boxcars beside a pickup truck on the prairie. You get butterflies in your belly just gazing at these massive chunks of beef.

"Our purpose at the refuge is to maintain a specimen herd of these old-time Texas cattle—sort of a cross section of an early-day herd, ranging from calves to old patriarch steers. It takes ten or a dozen years for horns on a steer to reach maximum growth, since he adds a little each year. Thus only the older animals have the best horns."

Today the refuge has 597 buffalo, the Longhorns, around 700 deer, 300 elk, fifty-three antelope and about 300 turkeys. And with 60,000 acres at their disposal, there's plenty of room. The native animals are gray foxes, bobcats, coyotes, raccoons, skunks, squirrels and smaller animals. The refuge supports the equivalent of over 1100 animal units of grazing each year in big game and Longhorns alone. That's about fifty acres for a grown cow a year.

More than seventy percent of the refuge is rocky, hilly land, inherently low in grazing capacity. The rest is highly productive bluestem range of the kind that has become almost as rare as the Longhorns and the buffalo.

Biltmore in Germany

(From page 32)

sity City because of the sweeping mantle of "loden cloth" he always wore, his heavy stick and the tremendously long and low black dachshund that trailed him and always came to a stop between the master's feet when the forester stopped to explain some point.

It should be noted that the forests of the city of Heidelberg, crowning the hills round about, contain a large number of plantations of American tree species. A century and a half ago the woodlands were very nearly ruined by fire, timber cutting and pasturing trespass. As forestry became known there were efforts to rehabilitate the woods, resulting in a growth of sprout stands which really never amounted to much. Eventually the city employed able foresters who succeeded in developing new forests by growing them from seeds and transplants, so that in 1912 there were already large and valuable mixed stands of conifers and hardwoods.

Germany was a country of contradictions; the ancient and modern were forever mingling. We visited in Darmstadt one day a very old and decrepit appearing structure that housed a steam sawmill, where logs were cut up "alive," that is, without being turned, and eventually came out as ready cut houses! Thus, in 1912, there was in Germany at least one "prefab" impressario, who deliv-

ered complete house patterns to contractors all marked and packaged for easy and quick erection.

Land was worth \$300 or more an acre there in the Rhine Plain, yet we encountered one Hessian forester who would not permit land values to interfere with the orderly employment of observation and logical thought. His domain included a small patch of possibly an acre where trees would not grow because June-bug larvae kept gnawing at the roots of whatever seedlings were planted by man or nature. Patiently he observed the habits of the June-bug, and finally discovered that Mrs. J. B. never laid her eggs in shaded ground. There was his cue! Thereafter he planted rows of trees around the perimeter of the barren spot, and after each planting waited for the little trees to get tall enough to cast shade, then planted another row within the shade ring. He estimated that the entire acre would be restocked in slightly under fifty years!

Frequent mention has been made of the use of American tree species in Germany. The main reason could be found in the fact that Europe possessed only a few native species, while America boasted hundreds, both conifers and broadleaf kinds. So Europeans experimented with exotics, and some turned out pretty well. However, the native trees were very fine for the local needs in struc-

tural, furniture and pulping wood, and of course vast quantities of fuel were taken from the forest as thinnings and logging waste. This complete utilization was the backbone of European forestry.

One may inquire why western Europe had only a few tree species, and the answer given by geologists is quite simple. The high mountain barriers which divide the Baltic and Mediterranean watersheds extend generally east and west. Therefore during the glacial epoch vegetation was pinched out by advancing ice because few forms of plant life could cross the regions above timber line.

Laurel Slicks

Laurel slicks, those large tree!ess areas of dense laurel and rhododendron found in the southern mountains, may often be converted to trees. The Southeastern Forest Experiment Station at Asheville, North Carolina, has found that pine seedlings may be planted in lanes cut through the slicks. If the lanes are made three-fourths as wide as the laurel is high, the young trees will overtop the laurel before the lanes close. In the first large-scale application of the method, 50,000 white pine seedlings were planted on the Pisgah National Forest.

Similarly few new forms have evolved in the relatively brief period since the glaciers receded from Europe. Here in America our mountain barriers extend north and south, so our plant life faded southward as the ice advanced but immediately crept northward again as the climate moderated during the alternating periods of warmth and cold. So we had a wealth of survivors and considerable development of new races or subspecies since.

There was much in Germany to remind us of the United States. The Rhine was a great timber stream which had borne logs and lumber from Switzerland, France and German states down to the seacoast markets of Rotterdam. And because of too heavy cutting, all three producing countries had heard the cry of timber famine, just as we in America heard it, albeit a century or two earlier than ourselves. In the Rhine Plain we saw signs of poor judgment and extravagance in the holdings formerly owned by the spendthrift princes of Ysenberg. They finally were forced to sell their woodlands, receiving only a pittance amounting to about \$300 for each acre. It was a sad story, yet we wondered where in North America one might find an acre of timber worth \$300, as of that date.

One day we passed through a small industrial hamlet named Nieder Saulheim. We visited the public school and all the pupils filed out into the yard, the day being sunny. There they stood at attention while the schoolmaster made an address of welcome and Dr. Schenck responded with words of appreciation of them and of one of their fellow townsmen who long ago had emigrated to America and done right well in the timber business, and had been a fine citizen of his adopted country besides. His name, we learned, had been Frederick Weyerhaeuser.

The closing phase of forest study in the Old World found us in the Black Forest of Wurttemberg and Baden. These two German states had their own efficient forestry departments. We spent much of the time working out of Kurhaus Sand, in the mountains south of Baden Oos. From our windows of a sunny winter morn we could watch the big dirigible which made regular sailings between points in the Rhine Valley. It was of especial interest to us because the outer envelope was made of beech veneer.

For the most part life in the Schwarzwald was made up of snowshoeing over or floundering through deep snow in pursuit of data about large spruces and firs, which always turned out to be across a deep ravine from where the cruiser found himself. There was a visit to a sawmill introduced by a bold man who admired all things American. He had bought his mill in Wisconsin and set it up in the Black Forest, only to learn too late that German workmen simply could not be taught to file high-speed band-saws, or otherwise maintain the vast aggregation of live rolls and semi-automatic machinery found in a large American mill. His venture was in the doldrums at the time of our visit.

What with daily lectures and field trips the weeks passed all too quickly. For many of us it was the closing phase of Biltmore as well as of the European trip. So there was a note of sadness when things past were mentioned. And there may have been a note of anxiety when the future was discussed, for few of us had jobs in prospect or knew whether we had sense enough to make a living in this new profession. But one day we came down out of the mountains and started for Rotterdam and the good old U.S.A., for better or for worse.



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E. C. MORAN Stanford, Montana FLIGHT INTO SUNSHINE, BIRD EXPERIENCES IN FLORIDA, by Helen G. Cruickshank. Published by The Macmillan Company, 60 Fifth Avenue, New York City. 132 pages plus sixty-four black and white photographs by Allan Cruickshank. Price \$5.

The Cruickshanks, one of the top writer-photographer naturalist teams in the country, pushed into the primitive depths of Florida's exotic wilderness to obtain the material for this fascinating book. Through water too shallow to pole a boat they waded in defiance of snakes, and sand sharks and stingarees; on tiny mangrove islands where firm ground was nonexistent they clambered Tarzan-fashion through the treetops, dragging bulky photographic equipment; within the cramped stifling spaces on their tiny bird blinds they waited through long hours of torrid tropical heat to observe the nesting behavior of their quarry, and catch some moment of flawless beauty in their lens.

They succeeded, too. Here are some splendid photographs of brown pelicans, Louisiana herons, Florida cranes, vultures, glossy, white and wood ibises, showy egrets and the great white herons. And Mrs. Cruickshank's sensitive descriptions are just as satisfying as the pictures.

THE HOME BOOK OF TREES AND SHRUBS, 2nd Edition 1949, by J. J. Levison. Published by Alfred A. Knopf, Inc., 501 Madison Avenue, New York 22, N. Y. 524 pages, illus., indexed. Price \$10.

This manual and guidebook to the design, planting and care of the home grounds, with information on lawns, woodlands, flower borders, garden accessories and the identification of trees has been completely revised, enlarged and reset. It is written in simple non-technical language, but its advice is expert, being based on long and varied experience of the author, one of America's outstanding arboriculturists and landscape foresters. It is an invaluable reference book for the home owner, amateur and professional gardener and landscape gardener. It teaches the amateur how to work out for himself a basically correct plan for the selection and handling of trees and shrubs for his own home grounds.

SPEAKING OF ANIMALS, by Alan Devoe. Published by Creative Age Press, 11 East 44th Street, New York City. 195 pages, illus. Price \$3.



This book presents a variety of studies of animal life-biographies of a score or more representative of creatures of the common countryside. ranging from chipmunks to deer. A patient watcher, Mr. Devoe writes informatively and with quiet humor. The thirty chapters of the book, material first presented in American Mercury and Audubon Magazine, have been selected for maximum diversity. Thus the chipmunks represent the world of little animals; deer. the big ones. Otters symbolize animal play; beavers, industry. There are chapters on the fury of the mink, one of the most terrible tempered of all animals; the snapping turtle; and the vulture which gorges itself on decaved meat until it can no longer rise from the ground. The reader meets the crayfish in the role of a mother. the chipmunk as an architect and the toad as a warrior.

HISTORY OF THE WHITE PINE IN-DUSTRY IN MINNESOTA, by Agnes M. Larson. Published by University of Minnesota Press, Minneapolis, Minnesota. 415 pages. Price \$7.50.

This is the complete history of the white pine industry which dominated Minnesota for at least five decades.

Agnes M. Larson, professor of history and chairman of the department of history, St. Olaf College, Northfield, Minnesota, explores all aspects of the rich and colorful era—including the technical side of the industry, its business organization, economic importance, the picturesque songs, customs and way of life of the lumberjacks. Those by-gone days live again in the pages of this well written and authoritative book.

How to Increase Plants, by Alfred C. Hottes. Published by A. T. De La Mare Company. Inc., 448 West 37th Street, New York 18, N. Y. 253 pages, illus. Price \$3.

This book tells the amateur how to multiply desirable plants by the most suitable method of propagation — seeds, cuttings, divisions, grafting, and so forth. Each step is clearly illustrated and carefully described in definite terms which can be easily understood by everyone. Gardeners are probably already familiar with other books by the author who was formerly professor of floriculture at Ohio State University and later associate editor of Better Homes and Gardens.

Sixty Below, by Tony Onraet. Published by Didier, 660 Madison Avenue, New York 21, N. Y. 192 pages. Price \$3.

Tony Onraet has led the thrilling and adventurous life of the trapper in the Northwest Territories of Canada. His unique experiences as set down in this book catch the magic of a daringly lived life. The pages are filled with talk about Indians and Eskimos, wild game, gold, radium, the Midnight Sun and the Northern Lights.

SOUTH CAROLINA RAW MATERIALS. by H. E. Shiver, B. F. Buie and Inman F. Eldredge. Published by University of South Carolina Press, Columbia, South Carolina. 219 pages, illus. Price \$3.

This book is the fourth in a series of social science studies concerning South Carolina's problems and opportunities. It is divided into three sections. Dr. Shiver depicts the present precarious position of cotton in the economy of the South and indicates steps which must be taken if the cotton textile industry is to survive. Dr. Buie presents a concise survey of the state's mineral resources and present industrial uses. Mr. Eldredge gives a complete analysis of the state's forest resources, then examines forest industries in the light of present practices and future potentialities.

AMERICAN PLANNING AND CIVIC ANNUAL, 1948, by Harlean James. Published by the American Planning and Civic Association, 901 Union Trust Building, Washington, D. C. 180 pages. Price \$3.

This is the thirteenth annual volume published by the American Planning and Civic Association to stimulate an understanding and appreciation of local, state, regional and national planning for the best use of urban and rural land, and of water and other natural resources. It contains a record of recent civic advances in the improvement and conservation of natural resources.

GUIDE TO AMERICA, by Elmer Jenkins. Published by Public Affairs Press, 2153 Florida Avenue, Washington, D. C. 705 pages, illus. Price \$3.75.

Here's a handy book to have around the house or in the glove compartment of your automobile. An "American Baedeker," it has been issued in cooperation with the American Automobile Association, and is a gold mine of useful information.

Here are a few of the things it has to offer: the story of each state, its history, geography, agriculture, plant and animal life and industries; information on every town and city of importance — specifying noteworthy sights, museums, art galleries, churches, parks, zoos, public buildings, educational institutions and in-

dustrial plants, the origin and background of significant shrines, archeological sites, battlefields, monuments and forts; where and when outstanding events — festivals, pageants, rodeos, sports competitions, auto races, regattas and expositions — are held regularly; calls attention to scenic and geographic landmarks; the features and facilities of all state and national parks; brief descriptions of state and national forests, reservations, agricultural experiment stations and game sanctuaries; and data on recreational areas and health resorts.

With over a million words, this volume contains innumerable suggestions which the traveler can put to practical and exciting use. It is illustrated with graphic maps, is indexed and cross-referenced.

Pollen Dust

(From page 21)

stains the pollen grains but not other organic matter. A drop of the solution is placed on a microscope slide and permitted to dry until the mass is barely moist. At this stage warm glycerine jelly is added and a cover class is affixed. This makes a fairly satisfactory permanent mount. Some of my samples prepared in this manner twelve years ago are still in good condition.

By aid of 640 X magnification and a mechanical stage, a count of 200 pollen grains is made at each footlevel. The counts are expressed in terms of percentage and graphically presented as a "pollen profile." Such profiles are read from bottom up like a geological timetable.

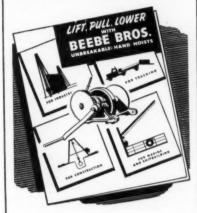
In the interpretation, it is assumed that the greater the pollen representation the larger the number of trees producing it in the forest composition.

A pollen worker must know his pollen grains as a forester knows his trees by various identifying features. We use variation in shape, size, or markings, number of germ pores, and so on. When size differences are the only means of identification, micrometer measurements become necessary. Needless to say, this is a time-consuming process.

Pollen analysis has a fascination which is difficult to express, for in these tiny specks of pollen dust are reflected the great silent centuries where nature worked uninfluenced by man, and graciously entrusted its tiny memoirs to the sparkling lakes of

vesterday. They filed them neatly, sheet on sheet, as each year brought springtime with its clouds of pollen dust. One thrills at the first record of a new genus. But one also feels a tinge of sadness as now and then a great vegetation bows out with steadily declining pollen records in everdeepening layers of dark brown peat. And then the curtain call. One lonely pollen grain, the last! One meditates for just a moment. How did the last tree die? Was it a stately monarch of his race, or was it gnarled and twisted like hands of old men weary of the years of toil? Such thoughts creep in as new pollen profiles develop into graphs, the microsketches of the throbbing life of phantom forests of the past.

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Desert Oasis

(From page 27)

stiffly along shore. A huge barrel cactus cast a pinkish glow where it grew in the rocks, creating an incongruous backdrop for the stately heron. Ducks, gadwalls, redheads, baldpates among them, scattered and drifted into wide marshes of ten-foot tules.

Gale had told me of the rare ocean birds, like the Heermann gull, red-throated loon, parasitic jaeger, and Sabine gull, which had been seen in this desert area along the Colorado River. Once he had found the white-bellied booby straying far from its course in an August migration. And this keen ornithologist had "bagged" three records of the European widgeon.

When we beached the boat in a quiet cove I asked to see the check-list of birds at Havasu Lake Refuge. And while Gale trailed off in search of bighorn tracks, I read the list with its total of 237 different species. It read like an exotic page from an ornithologist's dream-diary. Only this dream was true.

At Havasu there are bald and golden eagles, and by way of contrast, black-chinned hummingbirds!

There are also gilded flickers (which Roger T. Peterson describes in his book, A Field Guide to Western Birds, as the species with the head of the red-shafted flicker and the body of the yellow-shaft). Terns and doves and wrens are well represented with colorful different members of each respective family group.

Warblers range from Lucy's, the pert little, gray-backed, white-breasted warbler of the desert, with its distinguishing chestnut crown and rumppatch, to the black-capped, bright yellow pileated warbler, which is relative to the eastern Wilson warbler. There are American pipits and plumbeous gnatcatchers, Leconte thrashers and white-throated swifts.

There are, too, just plain robins and mountain bluebirds for the delight of the northern tourist. Shore birds answer roll-call to twenty-five species, ranging in size from the least sandpiper to the long-billed curlew.

Flocks of wood ibises spend their post-nuptial season at Havasu each midsummer. American egrets and the smaller snowy egrets breed here. The Arizona cardinal, which is brighter and larger than the eastern species, is a year-round resident. Flocks of white pelicans make their periodic spring migrations from mid-Marsh to the first of May, to this desert oasis. What a galaxy, what a paradise for the visiting naturalist, scientist, or just ordinary, run-of-themill, outdoor enthusiast to explore!

As we moved on again I noted all sorts of unexpected bits of desert life. The seemingly barren rocks were not bare at all. Wherever there had been the slightest moisture upon a speck of soil, a greenish sprig raised its grateful leaf to the sky. Or there was the tiny purplish flower of desert lavender, or the reddish blossom and greyish green leaves of the desert holly, a rubbery kind of plant which in this country is used for Christmas decorations.

At Blankenship Bend the topography began to change. Rock formations were lighter in color and there were trails of bighorns on the Arizona side with contrasting trails of wild burros on the California border. Just before we reached the Bend, however, my guide stopped the motor and pointed to the steep hillside which looked like a document from the Stone Age. Etched clearly upon the rocks, after hundreds of years of erosion, were Indian hieroglyphics.

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Soon we were entering Lake Hava-A clear warbling song of the canyon wren, sweetest songster of the desert, greeted us. Along the shores was a cacti show of ocotillo, cholla, and big barrel cactus, making a picture postcard of our journey. Changing to a luxurious cabin cruiser, we finished our journey to Parker Dam by the last rays of a setting sun, passing picturesque bluffs, high, red-colored rocks and a range called the Whipple Mountains.

As we headed for shore in the quiet of the late afternoon, a tiny melody bade us welcome to land. It was the lisping song of a ruby-crowned kinglet flitting into a tall creosote bush. There was no other sound. Just a beautiful silence softly punctuated by lapping water.

Old Arboretum Lives Again

(From page 20)

grader, snow plow and trail climber. the ieep, equipped with a flexible shaft and earth auger, helped plant over 25,000 daffodil bulbs in three days and facilitates the planting of tree seedlings.

In it we ride the main trail past the camp of the Delaware County Rangers. Girl Scouts who come each Saturday to help clear out dead wood and trash and to plant seedlings of willow and scarlet oak. Sixty-five girls volunteered to give twenty hours each to this work during the summer. Further on the Boy Scouts are building a cabin in a protected glade. Close by lies an historic Indian stone, a flat boulder on which the crudely-hewn compass points vary from true north by only one and a half degrees.

Mr. Whittaker drives past two recently timbered areas in the woodlands, one well done and one unsatisfactory. Here beech and poplar have been sold for basket making. He feels that closer personal supervision will be necessary for the twenty or thirty acres of tuliptrees to be cut next year, and in time he hopes to introduce more oak and tulip into predominantly beech areas. He would also like to see the creation on the property of a game preserve under state supervision.

From a locust grove, timber has been acquired by the Highway Department for guard posts. Eight acres of dogwood on the crest of a hill gives the illusion of springtime Valley Forge. Wherever the view opens up scattered wild pears, apples and cherries, many perhaps errant descendants of the fine original orchards, throw their lacy patterns over the land. On a hilltop a foot-high white pine has been wind seeded from a parent planting half a mile away. In the lowlands thousands of red swamp maples have burst their buds. Clumps of bittersweet and blueberry promise later harvest. In the woodlands, tiny yellow violets mingle with dozens of other wildlflowers.

"We want everyone to feel they have a share in the arboretum," Mr. Whittaker said as he inched the jeep down a steep hill. He tells of the many frequent visitors to the arboretum. Scouts, Audubon and horticultural societies, church groups of all denominations who hold vesper services or Bible classes under the Cedar of Lebanon, hikers and others who seek a few hours with nature.

"Everyone is welcome-and I am always glad to lecture when possible about the arboretum to any interested group," Whittaker said.

He mentioned that the Hill and Hollow Garden Club of Wallingford. had presented the arboretum with a fine magnolia collection, to be seen near the entrance gates.

We take a quick tour behind the arboretum nursery through a woodlot where 10,000 seedlings of hemlock, mountainlaurel, rhododendron and native azalea have been planted. Although a loss of about sixty percent of the laurel was noted, eighty percent of the hemlock survived. Clusters of seedlings are now well on their way.

Back at the mansion we find a botany professor from Swarthmore College. He has come to inquire if the deerberry is in bloom. This high bush huckleberry with sour, greenish-vellow fruit has still not blossomed. however. We chat for a bit and the professor remarks on the formation of the Cedar of Lebanon, its branches reaching semi-vertically to a high crown. In its ancient hills and in the Kew Gardens, he remarks, the branches tend to be more horizontal. the crown flat. Something in the local gneissic soil and new world climate has acted upon the growth of the cedar.

Once visited, the arboretum draws all back to it again with an irresistible charm. Even the spirits of the Painter brothers seem to linger in the century-old shadows of the trees.



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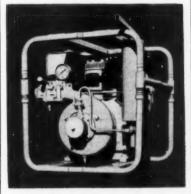
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When a River Runs Dry

(From page 30)

the only machinery and tools involved were the river-its fast moving water, sand and stones-and time. Perhaps the water caught a grain of sand in a slight hole or corner of a rock and whirled it around. Abrasive action started and the pothole was begun. More sand gathered in the tiny depression, then small pebbles and later larger stones. The action of the water drove the stones around and around in the hole, gradually grinding it larger all the time.

At Falmouth there are potholes of various types and sizes, varying from a few inches in depth and diameter to others over twelve feet deep and three and four feet in diameter. Some have worked clear through the rocks. others, close together, have run into each other and opened up cave, canvon and natural bridge-like formations in miniature. Most of the holes are bored vertically but a few were found running horizontally. Some are small at the top and spread out in diameter at the base, often nearly filled with fine dark sand. Shapes also vary from the perfectly circular to the oddly elliptical. A number of the high-placed holes still held water while others were dry. Some were filled with sand and stones. Many were empty. Numerous holes were roughly cut and ridged while a few were smoothly finished.

Across one little stretch of water loomed what at first appeared to be small icebergs. but on closer inspection proved to be finely carved rocks of a beautiful bluish cast, very picturesque as the lights and shadows formed many weird effects over the smooth and oddly sculptured surfaces. It is believed that the odd color is due to an organic deposit which coated the rocks as the water lowered.

Almost as far as one could see were acres of jumbled rocks with a scattering of sand and stones and hard cracked silt between. Every now and then on a somewhat higher place a scrubby contorted bit of sycamore. willow or river birch tree was bravely trying to get a foothold, often in the side of an opened pothole.

An elderly man remembered the river from the old days and pointed out huge, high, flat-topped boulders from which men used to net shad. Some of the larger rocks were especially prized possessions and various men even held deeds to them. A number of these rocks were later removed to let log rafts down the river during the lumber and rafting days which followed the Civil War. The rafts. floated down from the great forests of northern Pennsylvania, were sold at the various sawmills located along the

And so the things of the river that are run by man, like shad fishing. lumber rafting and canal boating. have their day and go; but the acres and acres of rocks and potholes have been here for millions of years and will very possibly be here for millions of years to come. The area is certainly worth exploring when the water level is as low as it was in October, 1947the lowest in possibly a half century.

As soon as the rains came and the river ran high again, many of the pothole rocks disappeared for another period of years-just how long it is difficult to say.

-AUTHORS-

JANE CARTER (Old Arboretum Lives Again) is a Pennsylvanian, now residing and writing in Washington, D. C. J. A. FITZWATER (A Forester Visits Greece) retired from the U. S. Forest Service several years ago, helped write the AFA's handbook "Managing Small Woodlands," and last year was appointed forestry specialist with AMAG. He's now in Maine fishing. JOHN D. KENDIG (When a River Runs Dry) is a Manheim, Pennsylvania, newspaperman, keenly interested in conservation. J. E. POTZGER (Reading Tree History in Pollen Dust) is a nationally known biologist and paleobotanist at Butler College, Indiana. GRACE V. SHARRITT (Desert Oasis), well known writer, is now living in Jackson, Wyoming. Russell Stadelman (Growing Quality Hardwoods) is chief forester for Nickey Brothers, Incorporated, Memphis, Tennessee. John B. Woods (Biltmore in Germany), nationally known forester, divides his time between Vermont and Oregon.

This Month With The ${ m AFA}$

FOR YOUR CONVENIENCE AND ENJOYMENT— Plan Now for Your Annual Meeting—October 10, 11, 12, 13

RESERVATIONS should be made at once so you can get the most out of beautiful Oglebay Park at Wheeling, Ohio's famous Muskingum Valley and your visit to Louis Bromfield's Malabar Farm. Full program was presented in August issue.

HOW TO REGISTER—Write Homer Fish, Chairman of Housing Committee, Oglebay Park, Wheeling, West Virginia. Or if you plan to take in only the last two days of meeting, registration may be made with the Akron Convention Bureau, Akron, Ohio.

Trail Riders for 1949—At the time of going to press, the following AFA members had either completed expeditions of the Trail Riders of the Wilderness, or were in the wilderness:

Great Smoky Mountains, Expedition No. 1, North Carolina and Tennessee-Miss Delma Best, New York; Steele Burden, Baton Rouge, La.: Miss Anne Criswell, New Castle. Pa.; Mrs. E. W. Criswell, Jacksonville Beach, Fla.; Mr. and Mrs. Milton Drexler, Great Neck, N. Y.; Eugene Helsel, Jr., Pittsburgh; Dr. C. L. and Lee Hobaugh, New Kensington, Pa.; Miss Edith E. Hocke, Nutley, N. J.; Robert A. Hughes, Olney, Md.; Mrs. Lucille P. Kenyon, Jacksonville, Fla.; Miss Jackie Kilby, Alexandria, Va.; Miss Helen L. Mc-Quillan, New York; J. Howard Mendenhall, West Chester, Pa.; Miss Marion B. Rector, Alexandria, Va.; A. B. Siegalaub, New York; Miss Elsie B. Simmons, Providence, R. I.; Miss Claire Solan, Richmond Hill, N. Y.; Miss Marie T. Spencer, Tacoma Park, Md.: and Miss Bertha J. Wood, Cincinnati.

Quetico-Superior, Expedition No. 2, Minnesota and Ontario—Samuel and Jared Alfend, Kansas City. Mo.; Dr. Robert J. Armstrong and Mrs. Evelyn Armstrong, Kalamazoo, Mich.; Lowell W. and Dr. Lowell C. Barr of Albert Lea, Minn.; Norbert M. Karmann, Dearborn, Mich.; Miss Laura Kriz, Berwyn, Ill.; Miss Ruth E. Lenderking, Baltimore, Md.; Dr. Eugene A. and David Ockuly, Toledo, Ohio; Miss Jewel M. Parker, Addison, Ill.; Mr. and Mrs. Carl F. Stocksiek, Philadelphia; Miss Wanda Wasawic, Philadelphia.

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Sawtooth, Expedition No. 8, Idaho—Miss Martha H. Biehle, Washington, D. C.; Roland Boertitz, Chicago; Miss Florence Clement, South Hadley, Mass.; Miss Margaret Grace Common, Detroit; Miss Eileen Carol Dean, Oakland, Calif.; Philip Goodell, Montclair, N. J.; Miss Lois R. Hartung, Chicago; Joseph N. Hessel, Ogden, Utah; Miss Marie H. Lynch, Chicago; Miss Frances Joyce McArdle, Chicago; Miss Catharine W. Pierce, Cambridge, Mass.; Mr. and Mrs. Roger Scholle, New York; Dr. and Mrs. Robert S. Smith, Boise, Idaho; Dr. and Mrs. Lester Tuchman, New York.

Membership of Expeditions 9, 10, 11, 12, 13, 14 and 15, running through late August and early September, will be published in a later issue.

EDITORIAL

We Need a Sense of Trusteeship

Kent Leavitt's thought-provoking article, "The Challenge of Land Ownership," found elsewhere in this issue, will not make pleasant reading for those who cling to the senseless concept that the privilege of owning land carries with it the right to plunder and destroy. In our democracy the sovereign state still allows citizens to own land in fee simple, to do with it as they choose. But there is a higher law that transcends anything devised by courts and legislatures—the responsibility of father to son, of one generation to another.

Mr. Leavitt, who besides being an operating landowner in Dutchess County, New York, is president of the National Association of Soil Conservation Districts, unquestionably has this well in mind when he states bluntly, "The time is rapidly approaching when, if we as citizens do not shoulder our responsibility of ownership, we will be forced, through the pressure of our increasing population, to submit to complete regulation."

In other words, unless we as individuals are farsighted enough to realize that we are but trustees of land, with the right to take a fair profit from it during our occupancy, but morally obligated to pass it on to our children with its fertility unimpaired, government will have to do our thinking for us. Complete regulation will mean the end of private initiative in land use. The legal right to "do as we please" with the land will have vanished and, along with it, individual enterprise that has made this nation the last bulwark of democracy.

This trend, of course, is already on the move. The cry for regional governments, valley authorities, regulation of timber cuttings and other forms of compulsion by law grows stronger and stronger. In many instances it comes from men who put power or politics before principle—but the voices of those who are losing faith in private initiative to adequately meet our growing land use problems, and in the spirit of public welfare, are increasing. And not altogether without reason.

The great problem, now as in the past, is how to develop in landowners and operators a sense of responsibility of trusteeship. Mr. Leavitt makes some excellent suggestions in this respect—and so have others. One approach of particular interest, and one which generally has been overlooked or neglected, is the rural church.

This door was opened wide by the Reverend L. H. Hass of the Bethany Christian Church of Evansville, Indiana, who sees in destructive land use the most persistent and general cause of conditions adversely affecting the rural church program in this country. Speaking recently to a group of soil conservationists, the far-seeing churchman emphasized that:

No institution is better fitted to point out what happens to people when their soil is destroyed, than the church. The rapid decline of ancient Israel, whose history is so well

known to the church, is the story of eroded soils and destroyed natural resources. The pharaohs of Egypt built a great civilization on the rich soil of the Nile; but now that once beautiful valley is a land of dry and drifting sands, and impoverished people.

The church must courageously warn of the cultural and moral decay which follows the destruction of a nation's soil and resources.

More than this, the church must generate a new spirit toward the land—must give motivation to a program of conservation education by interpreting it in terms of human living. Said the Reverend Hass:

"In addition to the economic, there are other powerful motives which can be used for soil conservation. The family tradition is one of these, for a man never is more in earnest than when he is leaving something good for his children. The best insurance for the continuance of family importance and stability in a community is good land ownership."

In other words, a sense of responsibility of trusteeship. But the churchman has more to say.

"Then there is a natural love of the land in the hearts of people which can be capitalized for the preservation of the soil. This appeal will transcend all others and reach the ancient love of home in the soul of man.

"Finally, there is a powerful religious motive. Since the dawn of time, when man first took up stone and mud and built an altar, there has been a recognized sacred relationship between God and earth.

"The great Jewish leader, Moses, after tending sheep in the wilderness for forty years, in close communion with God and nature, came one day upon a flaming bush. Through his amazed enchantment a voice was speaking. 'Take off thy shoes, Moses, for the ground upon which you stand is holy ground.'

"This particular piece of ground was no different from that five feet or fifty feet away or any of the land of the earth; but God had chosen this man and this moment to reveal a great and eternal truth: All ground is holy ground. The plot of ground which is home, the rolling upland, the sweeping prairie, the majestic mountain—all ground is holy when it becomes the happy home of beast of the field, the birds of the air, and children of man."

Somewhere along the road traveled by the generations, the flame of this irrefutable truth has flickered. It will be rekindled, for the tie that binds man to the land is enduring. But if we are serious about democracy as a way of life, we must not wait too long.

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